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ABSTRACT

This report describes the results of the first year of a five-year study whose overall aims are twofold: (1) to discover classroom strategies that can improve students' achievement, their self concept, and their belief in their own ability to control the type of reinforcement they receive in school; and (2) to develop procedures for training teachers to employ these strategies. The specific aims of the first year were to select instruments to assess the attitudes and classroom behavior of both children and teachers, and to ascertain the relationships, in a small sample of classrooms, between characteristic teacher behaviors and children's end-of-year achievement and attitudes. The sample was composed of six third-grade classes and their six teachers from a low-income, predominantly black district; measures were taken early in and at the end of the school year. Since the sample for the first year of the study was small, the results described here are considered to be tentative. Evidence from the first year suggests that an individualized style of teaching, as contrasted with group instruction, significantly increases students' verbal achievement; individualized teaching appears to be especially effective with those children with a relatively positive self concept to start with. The development of such a self concept and a belief in internal control of reinforcement appears to be more likely among children who are well regarded socially by teachers and peers. (Author)

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STANFORD CENTER
FOR RESEARCH AND DEVELOPMENT
IN TEACHING

Technical Report No. 30

EFFECTIVE REINFORCEMENT FOR ACHIEVEMENT BEHAVIORS IN DISADVANTAGED CHILDREN: THE FIRST YEAR

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Introductory Statement

The Center's mission is to improve teaching in American schools. Too many teachers still employ a didactic style aimed at filling passive students with facts. The teacher's environment often prevents him from changing his style, and may indeed drive him out of the profession. And the children of the poor typically suffer from the worst teaching.

The Center uses the resources of the behavioral sciences in pursuing its objectives. Drawing primarily upon psychology and sociology, but also upon other behavioral science disciplines, the Center has formulated programs of research, development, demonstration, and dissemination in three areas. Program 1, Teaching Effectiveness, is now developing a Model Teacher Training System that can be used to train both beginning and experienced teachers in effective teaching skills. Program 2, The Environment for Teaching, is developing models of school organization and ways of evaluating teachers that will encourage teachers to become more professional and more committed. Program 3, Teaching Students from Low-Income Areas, is developing materials and procedures for motivating both students and teachers in low-income schools.

The present report deals with work done as a component of the Center's program on Teaching Effectiveness.

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Abstract

This report describes the results of the first year of a five-year study whose overall aims are twofold: first, to discover classroom strategies that can improve children's achievement, their self-concept, and their belief in their own ability to control the type of reinforcement they receive in school; second, to develop procedures for training teachers to employ these strategies. The specific aims of the first year were to select intruments for assessing the attitudes and classroom behavior of both children and teachers, and to ascertain the relationships, in a small sample of classrooms, between characteristic teacher behaviors and children's end-of-year achievement and attitudes. Observation schedules were developed especially for this project. The sample was composed of six third-grade classes and their six teachers from a low-income, predominantly Black district. Measures were taken early in the school year and at the end of the school year.

Since the sample for the first year of the study was small, the results described here should be considered tentative. Similar analyses using a larger sample will be made during the second year. Evidence from the first year suggests that an individualized style of teaching, as contrasted with group instruction, significantly increases children's verbal achievement. Individualized teaching appears to be especially effective with children who have a relatively positive self-concept to start with. The development of a positive self-concept and a belief in internal control of reinforcement appears to be more likely among children who are well regarded socially by teachers and peers. The same favorable development is more strongly related to the teacher behavior of listening to children with approval than to initiating interaction with them.

EFFECTIVE REINFORCEMENT FOR ACHIEVEMENT BEHAVIORS IN DISADVANTAGED CHILDREN: THE FIRST YEAR

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INTRODUCTION

Educators generally have found that though scores vary widely in both groups, low-income black children on the average score lower on aptitude and achievement tests than middle-income white children. The Coleman Report (Coleman, 1966) and other studies (e.g., Battle & Rotter, 1963; Crandall, Katkovsky, & Crandall, 1965; Davidson & Greenberg, 1967; Leftcourt & Ladwig, 1965; Loye, 1971) have shown that the difficulties many so-called disadvantaged children have with school learning are associated with two factors: their belief that they lack control over the reinforcements they receive in school, or in other words, that the locus of control over reinforcement is not internal but external; and their negative self-concepts with regard to school learning and social relationships.

Among advantaged as well as disadvantaged children, lack of effort in school seems largely due to a child's feeling of powerlessness to win rewards by solid work. In some cases these feelings may be firmly grounded in reality: a child may have had experiences with teachers indicating that even if he makes an effort in school he is unlikely to be rewarded. It is generally thought that disadvantaged children, or those from a lower socioeconomic class are more likely to have had such experiences than advantaged children, owing to teachers' stereotyping. And data show a correlation between children's socioeconomic class and their belief in internal control of reinforcement. The tragedy is that, if there is discrimination against low-income children, they are in effect taught to believe that they cannot win rewards from school learning. Such children have little motivation to apply themselves in school, and often do not learn well. As a result their self-concepts are damaged, making it even less likely that they will succeed in school.

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Even if teachers give reasonable heed to individualization of work, and are acceptant enough to view the child's performance fairly objectively, many children already have negative self-concepts, perhaps developed from experiences with parents, earlier teachers, or peers. These attitudes may baffle even highly competent teachers and severely reduce the child's receptiveness to good teaching. Whether or not stereotyping is actively contributing to the problem, the vicious circle of negative self-concept, lack of effort in school, and hence failure to achieve must be broken early in the school years if a child is to make satisfactory progress. Such a cycle may occur more frequently among low-income or minority children than among middle-class Caucasian children.

This report covers the first year of a five-year study seeking to identify teaching strategies that could increase school achievement among disadvantaged children by improving their self-concepts and strengthening their belief in internal control of reinforcement--that is, by encouraging them to feel that they can do well in school and that their efforts to do well will be rewarded. The study's ultimate purpose is to develop procedures for training teachers to employ these strategies. In general the research findings are expected to fit the framework of an aptitude-treatment interaction in which student motivational variables will serve as aptitudes, and types of reinforcement by the teacher will serve as treatments.

Two types of measures were used in this study and are described below. The first type is child measures, consisting of tests, attitude inventories, sociometric responses, ratings, and observations of child behavior; the second is teacher measures, consisting of observations of teacher classroom behavior. During the first year, child and teacher measures were obtained from six third-grade classrooms in a district drawing from a population of lower-middle and upper-lower class children, racially predominantly black. Instruments for self-report by the children were administered twice during the school year. Observation schedules for assessing child and teacher classroom behavior were developed. Teacher behavior toward children was studied naturalistically, with no attempt being made to intervene in or modify the teachers' spontaneous styles. Later stages of the project did involve such interventions, the effect of which will be reported in subsequent publications.

Child Measures

The design of the study involved pretest and posttest measures of three types of child performance and attitudes: verbal achievement (ACH), self-concept (SC) in nine areas, and belief about the locus of control of reinforcement for academic achievement (LOC). Sociometric ratings (SD) by and toward the children were obtained, and coded observations were made of each child's classroom behavior. Additional pretest and posttest measures came from a forced rating scale on which the teacher rated each child in her class on physical, emotional, social, and intellectual development (TR). Some attrition occurred over the year, with slightly more children who scored low on one of the measures moving out of the classes than children who scored higher. The N for data analysis thus varies from a high of 115 to a low of 72, the latter figure having resulted when children were eliminated who had missing data due to absence or moving.

Verbal achievement (ACH) scores were obtained from the California Achievement Test (CAT), which was administered to the children by their classroom teachers at the end of the second- and third-grade years. The Sears Self-Concept Inventory (SC) (Sears, 1966) and the Hess Locus of Control (LOC) (Hess, 1968), copies of which appear in Appendix A, were administered to the children by trained examiners in January and May of the third-grade year. The examiners divided the children into groups of four or five according to reading ability and sex, and took them to a secluded location. Efforts were made to create a friendly and non-testlike atmosphere. Items were read aloud and occasionally paraphrased in a standard fashion. Reliability quotients previously obtained were high for the self-concept (.90) and moderate for the locus of control (.60) (Sears, 1966; Smith & Hess, 1972). Pretest and posttest stability correlations are given in Table 2 ($r = .50$ for both, $n = 115$).

The Sociometric (Social Distance) Scale (Cunningham, 1951), a copy of which appears in Appendix A-5, was administered in April to each whole third-grade class by the teacher or trained examiner. The children's classroom behavior was assessed by trained observers using a point-sampling technique. The categories observed appear in the right-hand column of Appendix B-2. Finally, classroom teachers were asked to rate their entire group of children on a forced normalized scale with four subscales: physical, emotional, social, and intellectual. The definitions for these scales appear in Appendix B-4. Weights for the ratings were one through four, four being highest, and a Total Teacher Rating (TR) was derived from the sum of the weighted scores.

Teacher Measure

To assess each teacher's usual classroom behavior, trained observers using a point-sampling technique estimated the frequency and quality of the teacher's interaction with children in his class (see Appendix B-2). The observations were conducted during April and May under circumstances as naturalistic as possible.

Goals of the First Year

The goals of the first year of the study were to answer two quite different questions. First, are the methods being used for classroom observation sufficiently varied, comprehensive, and objective to tap the reinforcement techniques that can be used to improve children's self-concepts and strengthen their belief in internal locus of control? Obviously, a sample consisting of six teachers and classrooms is small. Does it offer a fairly wide range of behavior? This question will be answered by descriptive data citing class mean scores, correlations, pretest and posttest within classes, and observed behavior frequencies.

Second, if the answer to the first question is tentatively positive, judging chiefly by ranges of behavior frequencies sampled, do differences among the six teachers in classroom behavior bear a predictable relationship to children's outcome (posttest) attitudes and achievement? To answer

this question we have used stepwise regression analysis, assigning dependent variable status to posttest child measures, namely achievement, self-concept, belief in internal control, and classroom behavior. The independent variables are considered to be the pretest child measures (what the child brings with him to the third grade in the way of attitudes, behavior, and experiences) and the experiences the child has in the third grade (the behavior of his teacher in the classroom, his interaction with peers, and his teacher's perception of him).

The first year of the study was thus devoted to seeking a generally definitive aptitude-treatment interaction between child characteristics (pretest) as the aptitude and interactions with teacher and peers as the treatment. Outcome (posttest) measures for the child with given pretest characteristics or aptitudes under varying conditions of reinforcement are regarded as the most significant results of the first year of the study. Obviously, the validity of these results depends on the reliability, validity, and comprehensiveness of measurement on all variables, as well as on the representativeness of the limited population of teachers and children sampled.

DESCRIPTIVE DATA

Mean scores on child and teacher measures for the six classrooms are presented here in order to show ranges of scores and the pretest-posttest stability of the instruments.

Tables 1 and 2 present data on class mean and pretest/posttest stability scores on child-dependent variables for six classrooms. Pretest achievement scores are from May of the previous year; pretest self-concept and locus of control scores are from January of the third-grade years. Of course, January was late in the year to ascertain what a child had brought with him to the third grade, but in the fall we were not prepared to test the children. There is a considerable range among the six classes in pretest mean scores, the differences between them being statistically significant in some cases.

Analysis of variance on verbal achievement revealed that the mean score of the School I classes (1 and 2) was significantly higher than the mean scores of the classes in the other two schools, both pretest and posttest. There were also significant differences in regression slopes from pretest to posttest. The classes in Schools I and III (1 and 2 versus 5 and 6) differed significantly when their mean scores were compared pretest to posttest: the classes in School III started at a lower level but improved their scores on the average more than the classes in School I, presumably owing to a teacher effect. Schools II and III also differed in this regard, but Schools I and II did not, even though the latter two showed the greatest difference on pretest mean scores. There were no differences between the sexes on mean scores pretest or posttest.

TABLE 1

Class Mean Scores: Child Variables

	Classes[a]											
	1		2		3		4		5		6	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Verbal achievement[b]												
Spring, 2nd grade	2.96	.78	2.78	.93	2.33	.63	2.23	.41	2.46	.42	2.34	.59
Spring, 3rd grade	3.86	.77	3.20	.79	2.79	.60	2.78	.60	3.32	.57	3.27	.66
Change	.90		.42		.46		.55		.86		.93	
Self-concept (3.0 is midpoint)												
January	3.71	.62	3.61	.43	3.58	.53	3.33	.45	3.56	.51	3.37	.38
June	3.72	.66	3.50	.43	3.72	.53	3.60	.57	3.31	.46	3.49	.59
Change	.01		-.11		.14		.27		-.25		.12	
Locus of control internal (16 possible)												
January	10.62	2.36	9.10	1.95	11.94	2.36	13.28	1.78	11.13	2.28	11.68	2.19
June	11.48	2.58	11.24	2.17	12.65	2.23	13.33	.94	10.50	2.31	12.46	2.74
Change	.86		2.14		.71		.05		-.63		.78	
N for class, January	22		20		26		25		22		21	
N for class, June	21		21		17		18		16		22	

[a]Classes 1 and 2 were in School I; classes 3 and 4 in School II; and classes 5 and 6 in School III.

[b]The normal score for a child in the spring of his second-grade year is 2.9; in the spring of his third-grade year, 3.9.

TABLE 2

Correlations Between Three Child Variables

	Classes						
	1	2	3	4	5	6	Combined
N =	21	21	18	18	16	22	116
Achievement, Spring second grade x Spring third grade	.78**	.90**	.85*	.48**	.80**	.74**	.65**
Self-concept, Jan. x June	.71**	.54**	.81**	.12	.60**	.25	.50**
Locus of control, Jan. x June	.58**	.58**	.41	.79**	.06	.45*	.50**
January tests:							
Achievement x self-concept	.34	-.07	-.15	-.12	.48*	.39	.17
Achievement x locus of control	.30	.13	.09	.25	.52*	.05	.01
Self-concept x locus of control	.58**	.38	.41*	-.10	.26	-.02	.14
June tests:							
Achievement x self-concept	.49**	.30	.39*	.21	.22	.06	.24**
Achievement x locus of control	.08	-.04	.12	.30	-.25	.06	-.06
Self-concept x locus of control	.05	.22	.06	.44*	.34	-.41*	.08

One-tailed test: * = $p < .05$
** = $p < .01$

On the self-concept instrument there were no significant pretest differences between the six classes or by sex. For the total sample, differences between pretest and posttest scores were insignificant, as were differences between the scores of the two sexes. On the locus-of-control instrument there were no significant differences pretest or posttest between schools; slopes pretest and posttest were parallel.

The pretest and posttest correlations for the various classes, which appear in Table 2, can be interpreted as follows. Verbal achievement stability is rather high, as expected. In class 4, which had a high rate of attrition, it was lower. Self-concept stability is reasonably high for four classes and for the total sample. In classes 4 and 6 it is lower: possible reasons as to why children's self-concepts changed in these classes are examined below in connection with the teacher behavior measures. Locus-of-control stability is also reasonably high for four classes and for the total sample. Notably, the exceptions are classes 3 and 5, and not the classes showing low stability on self-concept. Why children's concepts of locus of control changed in two classes will also be viewed in terms of teacher behavior.

Teacher Behavior

Table 3 presents percentages of different types of behavior (single categories) exhibited by the six teachers (1-6) of classes 1-6 as observed by trained observers. Details on definitions of these behavior categories, the technique of observation, and observer reliability appear in Appendix B; reliability of observation was high.

By inspection it appears that there is a significant range among the six teachers on most of the categories. Categories on which there is little range will be given less weight in the subsequent analysis of teacher effects on child performance and attitudes.

Patterns. In order to get a more comprehensive idea of each teacher's behavior, patterns were derived indicating how the teacher behaved when the six large areas of the behavior schedule--Direction, Object, Publicity, Behavior, Content, and Attention--are considered a gestalt, here called a "pattern." Percentages for the occurrence among the six teachers of patterned behaviors that occurred six or more times in the behavior of at least one teacher are presented in Table 4. As in Table 3, the base for the percentage calculation is the total frequency of behavior samples taken, ranging from 111 to 181. This table should be read as follows: in the case of Teacher 1, Pattern A occured during 5 percent of the total observation sample (138 rounds), whereas in the cases of Teachers 5 and 6 it did not occur at all.

Also to be noted at the bottom of Table 4 is the variety of patterns employed by any one teacher. These figures are quite similar, ranging from 40 to 50 percent for five teachers. For Teacher 6, who had a more varied style, different patterns constituted 71 percent of his total behavior sample. He also had a relatively lower frequency of these common patterns, labelled A - O.

TABLE 3

Teacher Behavior Samples: Single Category Frequencies
(Percentage of Total Behavior Samples by Teacher)

Category	Average	Teacher 1	2	3	4	5	6
Direction							
Initiates	62	62	80	78	65	26	51
Responds	22	24	12	18	18	63	41
Listens/watches	6	2	5	3	13	2	5
Noncommunicative	5	12	3	0	4	9	3
Object							
Single child	60	73	56	52	40	75	78
Small group	8	10	6	14	9	3	9
Whole group	27	5	37	34	47	16	12
Himself	4	11	2	0	4	6	1
Publicity							
Publicly	64	61	86	92	89	50	71
Privately	24	38	14	8	11	50	29
Behavior							
Provides information	16	17	18	19	21	9	10
Approval (Σ-13-19)	17	17	12	15	22	16	20
Asks questions	13	14	23	19	11	8	12
Offers choices, develops S's idea, suggests equality	5	5	3	2	8	7	10
Gives directions	18	14	14	19	12	23	30
Controls--moderate[a]	13	8	18	23	16	3	7
Controls (Σ 25-19)	21	11	32	26	19	19	14
Controls--harsh, short criticism	3	1	10	3	3	3	2
Criticism with explanation	4	3	3	1	1	12	5
Evaluating	6	10	4	1	4	12	5
Transition behavior	4	11	2	0	4	4	0
Content							
Subject matter	53	66	54	49	56	59	28
Routine procedures	22	20	9	21	13	36	46
Behavior	20	13	35	26	23	4	10
Attention							
Undivided	35	47	25	11	22	57	59
Divided	65	54	75	89	78	43	41
Total samples (base for percentage)	139	138	181	116	164	121	111

[a]The control categories are spelled out in more detail than others, and some overlap.

TABLE 4

Percentage of Behavior Patterns That Occur Six or More Times in the Behavior of at Least One Teacher

	Teacher					
	1	2	3	4	5	6
Initiates to single child publicly						
A-asking question about subject matter with divided attention	5%	6%	4%	2%	0%	0%
B-with moderate controls of behavior with divided attention	4	9	15	5	0	3
C-with harsh control or criticism of behavior with divided attention	0	4	1	1	0	0
Initiates to single child privately						
D-evaluating subject matter with undivided attention	5	0	0	0	1	0
Initiates to small group publicly						
E-giving directions about routine procedures with divided attention	1	1	5	1	1	0
Initiates to whole group publicly						
F-providing information about subject matter with undivided attention	0	3	1	8	0	2
G-providing information about subject matter with divided attention	1	8	13	9	0	0
H-asking questions about subject matter with divided attention	1	7	6	4	0	0
I-giving directions about routine procedures with undivided attention	0	2	2	0	8	5
J-giving directions about routine procedures with divided attention	0	1	2	4	2	0
Responds to single child publicly						
K-with approval about subject matter with divided attention	7	2	6	2	4	1
Responds to single child privately						
L-with approval about subject matter with undivided attention	1	0	0	1	5	2
Listens to single child publicly						
M-with approval about subject matter with divided attention	1	1	2	6	0	1
Noncommunicative, object self, publicly						
N-behavior indeterminate about routine procedures with undivided attention	4	0	0	0	2	0
Noncommunicative, object self, privately						
O-behavior indeterminate about routine procedures with undivided attention	5%	0%	0%	1%	0%	0%
Total frequency of behavior patterns A - O	47	79	65	71	27	15
Total frequency of behavior samples taken (used as base for percentages)	138	181	116	164	122	111
Percent accounted for by A - O	34%	43%	56%	43%	22%	13%
Different patterns (A - O plus others) used, any frequency --% of total behavior samples	47%	47%	43%	43%	52%	71%

Partial patterns of teacher behavior. In order to check on the variety of patterning in teacher behavior, a second analysis of patterning was made with less stringent requirements. These did not include all six dimensions on the behavior schedule, but rather two or three. Patterns that discriminated among teachers were selected and designated partial patterns P to W. Percentages of occurrence among the six teachers are presented in Table 5. These range from 0 to 27 percent. The latter figure occurs in the behavior of Teacher 6, who has been mentioned as having the most varied style of teaching. The base for the percentage is the same as in the preceding patterns.

TABLE 5

Partial Teacher Behavior Patterns Based on Fewer than Six Dimensions
(Percentages of Total Behavior Samples)

	Teachers					
Pattern	1	2	3	4	5	6
P-Moderate control of behavior with divided attention	6	14	19	11	0	3
Q-Provides information subject matter	15	17	17	17	9	4
R-Evaluates subject matter	10	1	0	1	11	3
S-Asks questions about subject matter, divided attention	5	12	11	6	0	0
T-Gives directions about routine procedures	5	6	12	5	19	27
U-Public approval to individual	11	7	12	14	5	12
V-Provides information to individual publicly	6	2	1	1	5	4
W-Provides information to whole group publicly	0	12	13	17	0	3
Percentage of total behavior sample accounted for	58	71	85	72	49	56

The bottom line on Table 5 shows the percentage of the total behavior sample accounted for by these partial patterns. The range is from 49 to 85 percent. Teacher 6 again has a relatively low percentage, though not the lowest. Teacher 3 can be said to have the least varied teaching style, since these partial patterns account for 85 percent of her behavior as sampled. She also had the highest percentage of the six teachers on the use of patterns A-O. Note the figures for patterns A-O and partial patterns P-W are overlapping, and may not be added.

Child Behavior

The use of the child behavior observation schedule is described in Appendix B, with detailed definitions of the behavior observed. Appendix B also gives figures on split-half reliability of the behavior samples. Table 6 shows the single-category frequencies of behavior obtained. Scores of children (unselected) who had a reasonable number of samplings of behavior (10 or more) were used. The number of children ranged from 9 to 16 per class, with a total of 83. The number of samples obtained ranged from 112 to 214 per class, with a mean of 168. However, the number of samples per individual child was too low to establish consistent patterns of behavior; the reliabilities comparing the first five with the last five rounds were low, although observer reliability was high. The sample of each child's behavior was probably too small to permit consistency to emerge.

Inspection of Table 6 shows that there are marked differences between classes in behavior displayed by the children. Class 1 is clearly the highest in noncommunicative behavior, with attention directed by the child toward himself or the task at hand, and in behavior suggesting motivation by curiosity, learning, or achievement. While this class ended up with the highest posttest achievement scores (Table 1), it also started out with the highest pretest achievement scores; its pretest-posttest gain was less than that of Class 6, which is characterized by more social motivation with children's behavior directed to a group (by the children) more often than in other classes. However, in Class 6 the social motivation was associated with higher attention by the child to the task than in Class 2, for example, which did not show as much pretest-posttest achievement gain.

Social climate of the classroom. The Social Distance Scale, which appears in Appendix A-5, was used to measure children's attitudes toward others. Three scores were derived from its administration:

1. Liking for others: the average degree of liking shown by a single child for all of the other children in his class.
2. Liking by others: the average rating of liking shown to a single child by all of his classmates.
3. Self-rating (a single score): the child's rating of himself as he thought most of his classmates would rate him.

TABLE 6

Child Behavior Samples: Single Category Frequencies
(Percentages of Total Behavior Samples by Class)

Category	Average	Class 1	2	3	4	5	6
Direction							
Initiates	20.7	19.6	23.2	17.9	22.7	18.4	21.7
Responds	26.0	7.0	40.4	36.6	28.9	12.6	30.7
Noncommunicative	53.4	73.4	36.4	45.5	48.4	68.9	47.6
Object							
Single child	20.0	11.7	26.8	25.9	21.9	12.1	21.7
Group	5.2	0.5	7.6	1.8	7.0	1.1	8.4
Teacher	19.3	15.0	26.3	17.0	19.5	17.4	21.1
Teacher/task	7.5	6.5	12.6	14.3	7.0	3.7	0.6
Himself/task	47.8	66.4	26.8	41.1	44.5	65.8	48.2
Content							
Work	62.1	83.6	58.1	47.3	52.3	73.2	57.8
Nonwork	34.0	14.0	41.9	41.1	43.8	23.7	39.2
Vacant	3.6	0	0	11.6	3.9	3.2	3.0
Affect							
Enthusiastic (Av. 6.6); positive (78.2); neutral, (12.5); embarrassed (1.5); negative (2.6); hostile (0.7)		Does not distinguish classes: should be combined with "Work."					
Motivation							
Affiliation, social	16.3	7.0	20.2	16.1	20.3	8.4	25.9
Curiosity, learning, achievement	53.8	86.9	43.4	30.4	49.2	66.3	47.0
Following directions	7.0	0.9	14.1	16.1	1.6	6.8	3.0
Compliance, unhappiness, disruption	1.7	0	6.1	3.6	0	0	0.6
Escaping boredom	17.6	3.7	13.6	28.6	25.0	17.9	16.9
Number of children	16	15	15	12	9	16	16
Number of samples	168	214	198	112	128	190	166

TABLE 7

Pupil Social Distance Means by Class

	Class					
	1	2	3	4	5	6
	(N = 24)	(N = 26)	(N = 28)	(N = 25)	(N = 22)	(N = 21)
Liking for others	2.6	2.6	2.8	3.3	4.3	4.6
Liking by others	2.7	2.6	2.5	2.4	4.4	3.1
Self-rating	2.7	3.5	3.1	3.5	3.2	3.2

Ratings by teachers. The six teachers rated the children in their classes twice--once in January and once in May--using the forms that appear in Appendix B-4. Since the technique required a roughly normalized distribution of children in each class, a comparison of the class means is not useful. Table 8 presents pretest and posttest stability coefficients and intercorrelations between the scores on the four scales for the pretest. The total score is simply the sum of the scores on the four scales.

TABLE 8

Teacher Ratings of Children: Intercorrelations of Scores on Four Scales and Total Score (Whole Sample N = 72)

	Total pretest (Jan.)	Total posttest (June)	Pretest Scales			
			Physical	Emotional	Social	Intellectual
Total pretest	1.00					
Total posttest	.74**	1.00				
Physical pretest	.69**	.43**	1.00			
Emotional pretest	.76**	.58**	.35**	1.00		
Social pretest	.69**	.61**	.21	.43**	1.00	
Intellectual pretest	.85**	.60**	.63**	.53**	.45**	1.00

**p < .01

The stability of the total score pretest-posttest is .74. But intercorrelations from scale to scale are not very high, suggesting that the teachers were making relatively distinct ratings on each scale, rather than ratings that reflected their overall impression of the child.

PREDICTIVE ANALYSES

The most general prediction made was that children's motivational characteristics of self-concept and belief in internal control of reinforcement would improve end-of-year tested achievement. Furthermore, it was anticipated that teacher behavior could be shown to affect the two motivational variables as well as achievement. Finally, an interaction between self-concept, belief in internal control, and teacher behavior was expected in accounting for variance in children's achievement.

Predictions involving the effect on achievement of relatively high or low self-concept and/or belief in internal control of reinforcement were as follows:

1. Past achievement (here, the pretest measure) will carry the most weight in determining later (posttest) achievement.

2. In children whose pretest achievement is relatively low, self-concept and/or belief in internal control of reinforcement will be important in determining the level of posttest achievement.

3. In children whose pretest achievement is relatively high, self-concept and belief in internal control will carry less weight in determining posttest achievement. Possibly lower self-concept will act as a spur to children who set high standards for their own accomplishments.

4. Over the entire sample, varying from low to high pretest achievement, there will be moderate positive relationships between posttest achievement and both self-concept and belief in internal control.

5. Self-concept and belief in internal control will be positively related.

The following predictions involve the effects of teacher behavior:

6. Better verbal achievement is anticipated among children whose teacher typically: (a) responds and listens to children more than he initiates; (b) interacts more with a single child than with the whole group; (c) interacts more privately than publicly; (d) gives a relatively high proportion of approval to children; (e) is relatively low on controlling behavior; (g) gives undivided attention more often than divided attention when interacting; (h) gives an explanation, rationale, or alternative when criticizing a child's work; (i) evaluates work with children (i.e., gives feedback).

7. Higher self-concepts are expected among children whose teacher typically: (a) responds and listens to children more than he initiates; (b) gives approval, offers choices, develops child's idea, suggest equality more than interacting with controls: (c) responds or listens to a single child with approval about subject matter.

8. Predictions involving belief in internal control as the target variable in children are quite similar to those involving self-concept, with the exception that approval by the teacher is expected to carry less weight, since it is a form of external rather than internal reinforcement.

9. The aptitude-treatment interaction (teacher behavior as interacting with child variables) pursued here was exploratory; no predictions were made concerning its outcome.

These predictions above were tested by three different methods of analysis:

(a) simple rank order correlations between teacher behavior categories and patterns and the three child measures, using class means as the child measures;

(b) stepwise regression analyses to account for variance in predicting posttest scores on the child measures;

(c) aptitude-treatment interactions with child pretest scores taken as aptitudes and teacher behavior as treatment.

The specific questions to be answered by the three methods of analysis are:

(a) What are theoretically predictable relationships between a teacher's behavior and the average verbal achievement and attitudes of children in his class?

(b) What is the contribution of each of the variables (both child and teacher) to the prediction of children's end-of-year scores on the three dependent child measures?

(c) Can it be shown that initial differences among children in self-concept and locus-of-control attitudes influence their later achievement?

(d) Using pretest scores as aptitude criterion measures, are different teaching styles more effective for children with different aptitudes?

Rank Order Correlations

Correlations between teacher behavior and class means on three child measures (N = 6). Tables 9 and 10 present the results of these analyses. Obviously the sample is very small. Rhos are given when they are equal to or greater than plus or minus .50. For a sample of this size, $p = < .05$ when rho is equal to or greater than .75; these correlations are marked by an asterisk (*).

a. Teacher behavior by single categories: achievement.

Achievement scores were higher in the spring in classes where the teacher often directed his attention to a single child at a time rather than to the whole group (Table 9). At times the teachers in the higher achieving classes remained out of communication with the children, whereas the other teachers maintained almost constant communication. Private interaction with the single child was more frequent in the higher achieving classrooms, and a good part of this interaction consisted of evaluating work with the child.

b. Teacher behavior by pattern: achievement

Patterns of teacher behavior have been derived from combinations of the foregoing single category scores. (For descriptions of the patterns, see Tables 4 and 5). Correlations with child measures are shown in Table 10. There is only one high correlation with achievement scores from the previous spring, suggesting that the children placed with a given third-grade teacher were a random sample as far as teacher behavior and its relation to second-grade achievement were concerned. For third-grade spring achievement scores there is one positive correlation with a pattern (D) of teacher behavior that is consistent with the results using single categories of behavior. When the teacher often initiates to a single child privately, evaluating subject matter with undivided attention, then the achievement of the class is greater in the spring. Note that the content of such initiation is not the child's behavior, but his work. Another pattern (V) correlated positively with spring achievement, indicating that the more the teacher provides information to individuals publicly, the higher the class mean spring achievement is apt to be.

A negative correlation occurs with pattern G in which the teacher frequently initiates to the whole group publicly, providing information about subject matter with divided attention. When this pattern was used often, mean class achievement was lower. It is interesting that this pattern (G) is never used by two of the three teachers with relatively high spring achievement, Teachers 5 and 6. When they do initiate to the whole group publicly, it is not to provide information but to give directions about routine procedures. These directions generally concern how children are to go about their individual work, and they are given with undivided attention. The two teachers had children whose gains in the third grade were good, even though their second-grade achievement was well below that expected. The third teacher (Teacher 1) whose class showed relatively high spring achievement showed similar behavior to Teachers 5 and 6 in evaluating a single child's work privately with him (pattern D). In addition, Teacher 1 was quite frequently out of communication with the children in his class, having started them on work and withdrawn to let them proceed.

Within this limited sample, then, it is clear that some teachers were able to conduct their classes more in the fashion of a tutorial rather than a lecture, putting greater responsibility for learning on the children and evaluating their work with them individually more often than other teachers. Children as a group made the greatest achievement gains in these classes.

TABLE 9

Teacher Behavior (Single Category) Correlated with Mean Scores of Six Classes on Three Tests (Rank Order Correlations)

Category	Verbal achievement		Self-concept		Internal locus of control	
	End 2nd grade	End 3rd grade	Jan.	June	Jan.	June
Direction						
T initiates				.72		
Responds				-.74		
Listens/watches	-.63[a]	-.58	-.76*		.58	.77*
Noncommunicative		.84*				-.53
Object						
Single child		.76*				-.59
Small group				.90*		.64
Whole group		-.84*				.50
Himself	.51	.78*	.50			
Publicity						
Publicly		-.75*		.51		.68
Privately		.74		-.53		-.69
Behavior						
Provides information				.73		.53
Approval (Σ 13-198)	-.68		-.76		.83*	.70
Asks questions	.54				.56	
Offers choices, develops S's ideas; suggests equality	-.65		-.71			
Gives directions						
Controls--moderate		.67		.59		
Controls--(Σ 25-29)		.55				
Controls--harsh, short criticism,					-.64	
Criticism with explanation				-84*		-.73
Evaluating		.75*				-.68
Transition	.57	.74	.52			
Content						
Subject matter	.52		.61			
Routine procedures						
Behavior						
Attention						
Undivided		.68		-.57		
Divided		.67		.59		

*p > ± .50 are given

p > .75 (.05 level)

TABLE 10

Teacher Behavior (Patterns) Correlated with Mean Scores of Six Classes on Three Tests

	Verbal achievement		Self-concept						Locus of control			
	End 2nd grade	End 3rd grade	Total		Divergent	Convergent	Happy qualities	School subjects	Internal Total		I+	I-
Pattern			Jan.	June	June	June	June	June	Jan.	June	June	June
A	.79*		.67	.61					-.55			
B		-.54		.62								
C									-.64			
D	.71	.84*	.65									
E				.53								
F	-.54	-.59	-.68							.70		
G		-.77*		.51								
H		-.62										
I				-.86*						-.55		
J	-.59	-.73	-.53						.63			
K	.63		.75*	.58								
L			-.80*							-.55		
M	-.54	-.62	-.64							.81*		
N			.67									
O				.54				.86*				
Partial patterns												
P		-.65		.77*								.58
Q		-.58										
R		.90*										
S		-.57										
T												
U					.76*		.56			.99*	.78*	.80*
V		1.00*										
W		-.91								.67	.76*	.60

In two of the three higher achieving classes (1 and 5), children's observed motivation was high with regard to curiosity, learning, and achievement, with work being more frequent than nonwork. In the third class, comparatively more social motivation was observed, and the percentage of time spent on work was not particularly high. Social distance data from the children show this class (6) to score the highest in children's liking for others. Average liking by others was not high, however. Children were friendly to one another without concentrating their choices on a few (see tables 6 and 7).

c. Teacher behavior: self-concept, total score

It was expected that children's self-concept would show gains in classes whose teacher did more responding to a child than initiating, and where approval outweighed control. These types of teacher behavior occurred more frequently in the three classes previously mentioned as higher in achievement in the spring, but these groups did not show regular gains in self-concept scores, and correlations between self-concept and these teacher behaviors over the six classrooms did not reach significance.

Unexpectedly, spring self-concepts were high in classes whose teachers directed their interaction to a small group rather than to a single child or the whole group. Also, teachers who interacted frequently with small groups often had higher frequencies of controlling interactions than those who did not, so that the interaction was fairly often negative in tone. The teacher was controlling a disruptive small group that was socializing. Post-hoc suggestions for the interpretation of this finding are the following. (1) Where much of the class interaction is from the teacher toward the whole group, interaction from the teacher toward a small group may provide greater opportunity for enhancement of self-concept in the children involved. This effect may extend to audience children as well because of the security involved in group rather than individual attention, particularly if the attention is negative. (2) Peer attention and support may be valuable to these children as reinforcement, whether the behavior is negative or positive. There may be a sense of "belonging" that works to enhance the self-concept.

Another unexpected finding in the relationship between teacher behavior and children's self-concept was a negative correlation between teacher's use of criticism with explanation and spring self-concept. Such teacher behavior occurred rather frequently in classrooms previously mentioned as being higher in achievement. This form of interaction is often associated with realistic evaluation or feedback on work from teacher to child. Possibly it conveys shame for poor performance, while some sensitive children may overlook the positive teaching aspects of the message. Over these six classes criticism with explanation had a detrimental effect on children's self-concept.

Two patterns of teacher behavior resulted in significant correlations with spring self-concept: Pattern I, initiating to the whole group publicly, while giving directions about routine procedure (negative); Pattern P, showing moderate control of behavior with divided attention (positive). The latter correlation goes against prediction. Pattern I was used most frequently by Teacher 5, whose class showed the greatest decrease in overall self-concept and the lowest spring self-concept scores, though close to the highest achievement among the six classes. Also, correlations between achievement and self-concept dropped from a significant January level to insignificance in the spring in this classroom, while remaining significant but low (.24) as expected in the combined group of 115 children. Thus, in the classroom that does not bear out the prediction, a child's self-concept becomes more independent of his achievement level.

d. Teacher interaction: self-concept subscales

The foregoing results have been based on self-concept total score, which is the sum of nine different subscales tapping various facets of attitudes toward self. It was observed that some children rated themselves higher pretest-posttest on some subscales and lower on others, resulting in little overall change on the total score. Class means also differed on certain subscales. It seemed likely that characteristic teacher interaction with children should be related to the children's predominant spring ratings of themselves in certain areas. For these reasons, some further correlations were computed; they are presented in Table 9 for the single categories of teacher behavior and in Table 10 for patterned teacher behavior.

Self-concept for divergent mental ability consists of items such as "Having new, original ideas," "Solving problems in ways others haven't tried," and the like. It is quite reasonable that children should rate themselves high on this subscale in classes whose teacher is high on offering choices to children (rho = .71), on giving approval (.89), and on pattern U, giving public approval to an individual (.76). Children whose teachers rated high on controlling behavior scored low on this subscale (-.67).

Self-concept for school subjects (e.g., "Being able to spell correctly," "Doing well in art work, painting or drawing") showed a positive correlation (.86) with Pattern O, the teacher behavior of withdrawing to his own work and remaining out of communication with the class, leaving the children to their work.

In sum, the rank order correlations between teacher behavior and self-concept over these six classes are unsatisfying in the light of the predicted relationships. It remains to be seen whether these findings are replicated in later studies with different teachers and children.

e. Teacher behavior: locus of control

How can a teacher foster a child's belief in his personal responsibility for the reinforcements (positive or negative) he receives in the classroom? In this area one positive correlation reaching significance was the teacher

behavior of listens/watches. This finding suggests that a nonintrusive style of teaching places more responsibility on the children than a style in which the teacher is frequently initiating interaction. As predicted, there was a positive correlation between children's belief in internal control and the teacher behavior pattern of listening to a single child publicly with approval about subject matter and with divided attention. In this sample, children whose teachers frequently displayed this pattern scored high in the spring on internal control.

The total internal locus-of-control score can be broken into two subscores: (a) belief in internal control over child's successes or positive events (I+), and (b) belief in internal control over failures or difficulties (I-). With these scores separated, the following positive significant relationships to teacher behavior were obtained:

Teacher behavior Pattern U: Public approval to individual . . . Post I+ (.78), Post I- (.80)

Teacher behavior Pattern W: providing information to whole group publicly Post I+ (.76).

f. Summary

Rank order correlations relating teacher behavior and child scores at the end of the year on three dependent measures for a limited sample of six classes have been presented. Spring verbal achievement scores are associated with a teaching style involving interaction with a single child, often private and evaluative of the child's work, rather than with the whole group.

Spring overall self-concept scores when related to teacher behavior did not produce the predicted results. A positive correlation occurred when the teacher made frequent initiations to a small group rather than to a single child or the whole group, and there was a negative correlation when the teacher coupled explanation with criticism. The self-concept subscale of divergent mental ability showed the expected positive correlation with teacher approval. These results do not lend much support to the notion that teachers' influence on self-concept will enhance achievement, though the overall correlation between self-concept and achievement in the spring is low positive, as has been found in other studies (Coopersmith, 1959; Sears, 1963).

Spring scores on belief in internal control of reinforcement were higher in classes in which the teacher listened or watched more frequently than the average teacher, and in which he listened to individual children with public approval. These relationships make sense in terms of predictions. In this sample, however, there was a correlation between I+ and the teacher behavior of directing attention to a small group rather than to an individual or the whole group. These teaching styles may serve to avoid putting the individual in a threatening or difficult position in the public view.

Child behavior measures. Relationships presented here are first, between child behavior and child test scores, and second, between child and teacher behavior.

a. Rank order correlations between child behavior and class mean scores on three dependent child measures

Because of the limited amount of data obtained from the child behavior observation procedure, little confidence can be placed in relationships obtained with the child dependent measures. The following are significant (rho equals .75 or more) correlations obtained by relating mean individual child behavior scores for three or four subsample children in each class to class mean scores on achievement, self-concept, and locus of control. The subsample children, incidentally, were representative of the children in the total of 83, since their mean behavior scores paralleled very closely those of the total class.

b. Correlations between child behavior and teacher behavior

Does a teacher tailor his behavior to that of his class group and/or dies children's behavior follow a predictable pattern in association with a given teacher behavior? The following correlations have been obtained between child and teacher behavior (n = 6; rho greater than .75 is at the .05 level of significance).

1. Children respond more when teachers exercise controls more frequently (.81).
2. Children are more often noncommunicative when teachers exercise fewer controls.
3. Teacher Pattern R, the behavior of evaluating subject matter, is associated positively (.76) with noncommunicative child behavior.
4. The child work behavior is also associated with Teacher Pattern R (.84). Moreover, teacher patterns V and W are related, but oppositely, to child work behavior: Pattern V, providing information to an individual publicly, is positively associated with work behavior (.93), whereas Pattern W, providing information to the whole class publicly, is negatively related to child work behavior (-.84). It probably occurs only rarely that a whole class needs the same information at the same time; Teaching Pattern W appears to turn children away from work, whereas Pattern V, where the teacher provides information to an individual who presumably needs it, turns the class toward work.
5. In terms of affect, children's behavior of positive or normal interest was associated again with Teacher Pattern R, evaluating subject matter. This pattern was prominent in the behavior of Teachers 1 and 5, two of the three whose classes ranked highest in achievement gains.

6. Predominant child motivation characterized as curiosity, learning, achievement, or following directions was positively associated with Teacher Patterns R and V, evaluating subject matter (.76) and providing information to an individual publicly (.78).

7. Another type of child motivation--compliance, disruption, unhappiness--is related to the teacher behavior of offering choices (.77). This teacher behavior is relatively frequent in Teachers 4, 5, and 6. Possibly these teachers may have countered such behavior in some children by offering choices rather than by exerting controls. It has been mentioned previously that classes showing a relatively high degree of this child behavior were on the average lower in self-concept at posttest.

Summary of rank order correlations. These results show associations between child work behavior and the teacher behavior of providing information to an individual child rather than to the whole group. The child motivation of curiosity, learning, or achievement also appeared to be related to this teacher behavior. Controls by the teacher were positively associated with child response: children were more likely to be noncommunicative when the teacher used relatively few controls and relatively frequent evaluation of subject matter. But children also showed more positive interest in their learning when they received more evaluation.

The results do not indicate whether teacher behavior was a cause or a consequence of child behavior, but they do indicate the sort of climate normally prevailing in the six classes. Some small indications of behavioral manifestations of children's self-concepts and belief in internal control can be seen. Child achievement and learning motivation, observed behaviorally, are positively associated with scores on spring achievement tests.

Stepwise Regression Analyses

Several analyses have been performed to predict the children's posttest scores on achievement, self-concept, and belief in internal control on the basis of child and teacher aptitudes and behavior.

Analyses with child measures and teacher behavior. These analyses were run on a sample of 72 children for whom complete data were available. They represented an attempt to examine the relative effect different variables had in predicting scores on the three dependent child measures and relevant subscales. Although 49 variables have been entered into these analyses, only those that contributed 2 percent or more to the prediction of the dependent variable have been reported; almost all are significant at an F level of .05. The 49 variables are as follows:

1. School identification
2. Teacher identification
3. Student identification
4. Sex
5. Quadrant
6. Verbal achievement posttest
7. Self-concept total posttest
8. Locus of control posttest
9. Self-concept subscale divergent posttest
10. I+ posttest
11. I- posttest
12. Verbal achievement pretest
13. Self-concept total pretest
14. Self-concept subscale physical ability pretest
15. Self-concept subscale attractive appearance pretest
16. Self-concept subscale convergent pretest
17. Self-concept subscale social relations pretest
18. Self-concept subscale social virtues pretest
19. Self-concept subscale divergent pretest
20. Self-concept subscale work habits
21. Self-concept subscale happy qualities
22. Self-concept subscale school subjects
23. Locus of control pretest
24. Locus of control, I+, pretest
25. Locus of control, I-, pretest
26. Teacher rating, sum of 4 scales, pretest
27. Teacher rating, sum of 4 scales, posttest
28. Teacher rating, physical, pretest
29. Teacher rating, emotional, pretest
30. Teacher rating, social, pretest
31. Teacher rating, intellectual, pretest
32. Child social distance, liking by others
33. Child social distance, liking for others
34. Child social distance, liking by others
35. Teacher behavior, interacts with small group
36. Teacher behavior, criticism with explanation
37. Teacher behavior, approval
38. Teacher behavior, listens/ watches
39. Teacher behavior, evaluation
40. Teacher behavior, offers choices
41. Teacher behavior, sum of controls
42. Teacher behavior, pattern D
43. Teacher behavior, pattern K
44. Teacher behavior, pattern L
45. Teacher behavior, patterns K and L
46. Teacher behavior, pattern V
47. Teacher behavior, pattern P
48. Teacher behavior, pattern U
49. Teacher behavior, pattern W

In the tables on regression variables, sign of final coefficient (positive or negative) is indicated in the right-hand column. In cases where this direction changed in the course of the stepwise regression, possible explanations are offered in notes to the tables. A simple correlation between a single independent variable and the dependent variable is indicated by r. A multiple correlation between the entered independent variables and the dependent variable is indicated by R. The multiple correlation coefficient squared RSQ, indicating the amount of variance accounted for in the dependent variable by the entered independent variables, is given for each of the dependent variables in Tables 11 (achievement posttest); 12 (self-concept posttest); 13 (self-concept divergent thinking posttest); 14 (locus of control posttest); 15 (locus of control I+), and 16 (locus of control I-). The increase in RSQ accounted for by each independent variable is included to show its relative weight in predicting the dependent variable. Variables are listed in the order of entry according to their partial correlation with the dependent variable.

The previous discussion of teacher behavior has shown that the classes of teachers who individualize instruction seem to have higher posttest achievement. Although the regression analysis (Table 11) supports this conclusion in that Pattern V seems to account for some of the total variance in achievement (6 percent), pretest achievement greatly overshadows teacher behavior in predicting posttest performance. In this sample, in fact, pretest achievement

TABLE 11

Regression Variables Predicting Verbal Achievement Posttest (June 1970)

Variables	r	R	RSQ	Increase in RSQ	Sign of final coefficient
Verbal achievement pretest (May 1969)	.81	.81	.65	.65	+
Teacher rating of child on intellectual scale (Jan. 1970)	.77	.86	.74	.09	+
Teacher behavior Pattern V--"gives information to individual publicly" (Treatment Two Teachers--high)[a]	.37	.90	.80	.06	+

[a]See Table 17 for a description of treatments (teacher behaviors).

TABLE 12

Regression Variables Predicting Self-Concept Posttest
(May 1970)

Variable	r	R	RSQ	Increase in RSQ	Sign of final coefficient
Self-concept total, pretest (Jan. 1970)	.52	.52	.27	.27	+
Teacher behavior "criticize with explanation" (Treatment Two Teachers--high)	-.23	.58	.33	.06	-
Teacher behavior Pattern L--"private approval to individual"[a] (Treatment Two Teachers--high)	-.15	.66	.44	.11	+
Child social distance self-rating	.35	.70	.49	.05	+
Teacher rating of child on social scale (Jan. 1970)	.17	.72	.52	.03	+
I- pretest	.04	.75[b]	.56	.02	-

[a]Pattern L has a negative relationship to self-concept initially, but when the teacher behavior "criticize with explanation" is included, it assumes a positive weight in predicting self-concept.

[b]Also included in this analysis, but not reported here, is an interaction factor between children varying on three dimensions: Ach, SC, LOC. This factor accounted for the .02 increase in RSQ, which is included in the total R (.75).

accounts for 65 percent of the variance in posttest results. However, the forced-choice teacher rating of a child's intellectual ability, administered in January 1970, also accounts for 9 percent of the variance. Since the teachers had seen pretest achievement scores, and by January seemed to have been able to predict posttest achievement to a fair degree (teacher forced rating accounts for 59 percent of the posttest variance when entered without achievement pretest), we may be viewing some expectancy effects.

As Table 12 shows, self-concept pretest accounts for only 27 percent of the total variance in predicting self-concept posttest. Some teacher behavior accounts for part of the additional variance, notably Pattern L, --private approval to individual students--which accounts for 11 percent. A teacher's use of criticism with alternatives or explanations seems to be perceived as deprecating by students--a somewhat unexpected finding. As expected, however, a child's own perception of how much others like him as well as the teacher's rating of his social ability clearly affects his self-concept. In general, the results of the analysis are not satisfactory in terms of confirming prior notions about variables affecting self-concept. It may be that correlation is not a good way to use self-concept scores, since there is regression to the mean from both low and high groups at pretest, and since both extremes of scores may involve a defensive evaluation of the self.

The results on self-concept divergent thinking (Table 13) seem similar to the other results on self-concept. However, the fact that children's "happy qualities" in January and a generally positive self-concept in January predict satisfaction with divergent ability in June, implies that having relatively tolerant, comfortable feelings about himself encourages a child to explore different ways of thinking about things. Again, the results do not account for much of the total variance in self-concept divergent thinking scores. The two treatment groups of teachers do not differentiate well on approval but this factor, as predicted, does affect this aspect of self-concept.

TABLE 13

Regression Variables Predicting Self-Concept
Divergent Thinking Posttest (May 1970)

Variables	r	R	RSQ	Increase in RS	Sign of final coefficient
Self-concept happy qualities scale, pretest (Jan. 1970)	.48	.48	.23	.23	+
Teacher behavior-- "approval" (Teachers 1,4,6, high; Teacher 5 next highest)	.35	.60	.36	.13	+
Self-concept total, pretest	.42	.65	.42	.06	+

Previous discussions of teacher behavior relating to locus of control found that teacher approval extended to a single child was positively related to a child's belief in internal control. Similarly, it seems that the extent to which a child is liked by others in his class, as well as his teacher's feelings about (or rating of) his sociability, plays a relatively important part in a child's perception of locus of control (see Table 14). Perhaps the environment of teacher-classmate approval enhances a child's ability to accept responsibility for what happens to him. However, since only 44 percent of the total variance in locus-of-control posttest scores was accounted for in this analysis, there may be many more important variables that influence children's perceptions of locus of control.

TABLE 14

Regression Variables Predicting Locus-of-Control Posttest (May 1970)

Variable	r	R	RSQ	Increase in RSQ	Sign of final coefficient
Locus-of-control total, pretest (Jan. 1970)	.48	.48	.23	.23	+
Child social distance--liking by others	.39	.57	.33	.10	+
Teacher rating of child on emotional scale (Jan. 1970)	-.14	.63	.40	.03	-
Teacher rating of child on social scale (Jan. 1970)	.11	.65	.43	.03	+
Teacher behavior--"criticism with explanation" (Treatment Two Teachers--high)	-.31	.67[a]	.44	.02	-

[a]As in Table 12, a variable not reported was included here: children low in ACH, high or low on SC, high on LOC. This variable entered the analysis third in order, with an increase of RSQ of .04 in a negative direction. The total R of .67 includes this increase.

TABLE 15

Regression Variables: Locus of Control I+, Acceptance of Responsibility for Successes, Posttest (May 1970)

Variables	r	R	RSQ	Increase in RSQ	Sign of final coefficient
I+, pretest (Jan. 1970)	.39	.39	.15	.15	+
Teacher behavior Pattern W--"gives information to whole group publicly" (Treatment One Teachers--high)	.30	.48	.33	.08	+
Self-concept Social Virtues Scale, pretest	-.31	.53	.28	.06	-
Teacher rating of child social scale (Jan. 1970)	.18	.59	.35	.07	+
Self-concept, happy qualities scale, pretest	.03	.67[a]	.42	.02	+

[a]Children with low and high achievement scores, both with low SC and with low LOC, provided an interaction unreported here. This interaction amounted to .05 increase in RSQ, which is included in the total R of .67.

The most interesting and meaningful findings from the analysis of locus of control I+ (Table 15) are those confirming the importance of the social climate to the child's acceptance of responsibility for his successes. The teacher rating and the child's happy-quality feelings suggest the positive nature of this climate for children high on I+. There are low significant correlations between I+ posttest scores and children's liking by and for others, though these variables are not significant predictors in the regression analysis. Surprisingly enough, children's feelings of "social virtues" (empathy, sensitivity toward others) relate negatively with I+; perhaps the children who rate themselves low are being modest or even excessively critical of themselves, since their classmates and teachers seem to have a different opinion. This possibility warrants examination in the future.

TABLE 16

Regression Variables: Locus of Control I-, Acceptance of Responsibility for Failures (May 1970)

Variables	r	R	RSQ	Increase in RSQ	Sign of final coefficient
I-, pretest (Jan. 1970)	.58	.58	.34	.34	+
Child social distance--liking by others	.35	.65	.41	.07	+

Children who are liked by others may thereby be more able to accept responsibility for both their successes and their failures. The results reported here definitely fall short of constituting meaningful evidence on the prediction of locus of control I-, as Table 16 shows.

To summarize, several conclusions can be drawn from these regression analyses.

One can improve the prediction of children's verbal achievement at the end of the third grade over that at the end of the second grade by adding the teacher's judgment of a child's intellectual qualities to teacher behavior in giving information to individuals. The final result, accounting for 80 percent of the variance, is higher than is usually seen. The greatest part of the variance in posttest achievement is obviously accounted for by pretest achievement (65 percent), preventing the emergence of other teacher behavior variables as predictive according to the criteria used here. This finding is in line with that of other investigators (see Rosenshine, 1971), and also with our Hypothesis 1, predicting the importance of pretest achievement. It goes against the grain, however, to regard student achievement as barely influenced by teacher behavior. Perhaps educational researchers would be wise to continue the search for teaching strategies that do influence achievement in children. The difficulty may lie in the crudity of our behavior observation instruments. In line with our Hypothesis 6, teacher emphasis on information rather than on behavior, and on interaction with individual children rather than with the whole group, emerges as predictive of child achievement.

The self-concept prediction is less accurate overall than the achievement prediction, accounting for about 54 percent of the variance. The pretest-posttest relationship between self-concept scores is lower than that for achievement scores--.52 as compared to .81--and teacher behavior or approval shown to a single child combined with infrequent criticism came out as predicted in Hypothesis 7.

Hypothesis 8 predicted that children's belief in internal control of reinforcement would be affected by teacher behavior. The findings show little evidence of such a relationship, however. Rather, teacher and peer perceptions of the child on social dimensions appear associated with child belief in internal control, indicating that the social climate of the classroom is more influential than specific teacher behavior.

Analyses with child behavior data and dependent measures. These regression analyses were run on a sample of 78 children for whom complete data on the dependent measures were available and for whom we had ten or more rounds of behavioral observation data. Although data on 16 behavioral measures were entered into the equation for each child, there were wide ranges of distribution of occurrence of each of these behaviors for each child, since there were few rounds in the behavior sample. Data were entered for the following variables: child initiation, child response, child noncommunication; child interaction with a single child, a small group, or a teacher, teacher and task, or himself and task; whether the child was working, nonworking, or vacant; whether he displayed enthusiastic, positive, or neutral affect; whether he was motivated by social considerations, a desire to achieve, compliance, a desire to be disruptive, unhappiness, or just a need to escape boredom.

The child behavior data seemed to be less than adequate for predicting achievement. Using cut-off criteria similar to those used in the previous regression analysis ($p = < .05$, or accounting for at least 2 percent of the variance in the dependent measures), the investigators found that the child data could account for only 17 percent of the variance in posttest achievement (end of third grade). While no behavior data that helped explain the behavior of children who learned successfully were found, two sets of behavior data appeared to account for those children who did not achieve as well as their classmates. Children who displayed behavior that was essentially an attempt to escape boredom (7 percent of variance) or who were embarrassed, negative, or hostile (4 percent of variance) in their behavior achieved less than those who did not display these types of behavior. Since there were low frequencies of all these behaviors, it seems even more significant that these negative responses to the classroom environment significantly accounted for variance in achievement.

In predicting self-concept from child behavior data, we again find disappointingly few results. In fact, the only result worth mentioning seems to be that children who are relatively noncommunicative have lower self-concepts in their posttest scores (9 percent of the variance). There may be several reasons for this phenomenon. It would be interesting to see whether the children who were noncommunicative in our sample had relatively low pretest self-concept scores, and what their pretest and posttest achievement scores were.

In predicting belief in internal locus of control we again find, as with self-concept, that relatively noncommunicative children seemed to have lower posttest scores (accounting for 8 percent of the variance). These findings

are interesting when associated with the previously discussed regression findings suggesting the importance of social variables and approval for developing self-concept and belief in internal locus of control. If children are noncommunicative, they have less chance to be social with other members of their class; hence they are less likely to develop in these areas.

Aptitude-Treatment Interaction Analyses

A child enters third grade with some fairly well established "aptitudes" based on his genetic endowment and his past experiences in and out of school. In this study several of these aptitudes were examined for their effects in predicting a child's scores on the dependent variables at the end of third grade. Obviously, if a child's previous achievement is high, it will permit him to progress to higher levels more easily; if low, it will handicap him to some extent during the year. As we have seen, however, research is based on the thesis that two important attitudes the child brings with him to the learning situation affect his achievement: (a) his confidence in himself as an achiever (self-concept) and (b) his belief that he, himself, rather than external forces, is responsible for his successes and failures (belief in internal control). These attitudes are predicted to affect the achievement outcome when the effect of earlier achievement is held constant.

Furthermore, there is believed to be an interaction between aptitude and the kind of teaching a child receives. We know that some teachers are more effective with slower learning children than with bright children. Some apparently enjoy and work better with children who are self-confident and independent, whereas others are adept at drawing out the less confident children who may suffer from anxiety when faced with learning tasks or tests. We know very little, however, about exactly how these intuitively ascribed teacher styles are expressed in teachers' overt classroom behavior.

The major thrust of this research, then, is to examine three of the child's initial aptitudes--achievement, self-concept, and belief in internal control--and to provide evidence of how the teacher's classroom behavior interacts with these child aptitudes to produce end-of-the-year outcomes in child achievement and attitudes.

Groupings of teachers by style. With regard to teacher style, our six teachers (admittedly a small sample) can readily be divided into two groups of three each. (The coding scheme for observing teacher behavior has already been described, and frequencies of different categories of behavior for the six teachers have been shown in Tables 3, 4, and 5). The teaching styles of the two groups were then designated as the two instructional treatments for this analysis: the style of Teachers 2, 3, and 4 (T2, T3, and T4) was labeled Treatment One, while that of Teachers 1, 5, and 6 (T1, T5, and T6) was labeled Treatment Two, since these two groups of teachers were most consistently differentiated on the various teaching dimensions that were behaviorally sampled.

The two instructional treatments (see Table 17) can be generally characterized as follows. Treatment One represents the more traditional whole-class approach to teaching. The three teachers in question, when compared with the other three, scored higher on initiating (direction) to the whole group (object) publicly, with divided attention. In the category denoting type of behavior, this group of teachers scored higher than the other group on providing information and on the use of controls, and the content of their interactions with students was more often concerned with behavior. In Treatment Two by contrast, the teachers more often responded (direction) to a single child (object) privately, with undivided attention. In the category denoting type of behavior, this group on the whole was less often providing information or using controls, and more often criticizing with explanation and evaluating. To some extent they also scored higher on giving directions. The content of their interactions was more often routine procedures than was the case for Treatment One teachers.

Similar data were inspected to differentiate teachers according to occurrence of patterns of behavior. The division of teachers on the basis of these patterns generally reflected the single category frequencies and thus substantiated the grouping that has been delineated.

Plan of analysis. In order to determine whether there were any interactions between learner aptitudes and instructional treatments, regression analyses were run for all nine possible pairings of the three pretest measures (aptitudes) and three posttest measures (criterion measures) of achievement, self-concept, and locus of control for the two treatment conditions. Regression analyses were also run for the six individual teachers in order to check for consistency within treatment groups. Tests for parallelism of regression were made to determine whether there were significant differences between the slopes for the treatment groups or those for the six individual teachers.

A second set of analyses was run later, after inspection of the plots from the original analysis showed three cases of students with extremely low scores on the self-concept pretest measure. These three cases (one in each of classes 3, 4, and 1) had self-concept scores of 1.94, 2.08, and 2.17, whereas all of the 112 children in the remaining sample had pretest self-concept scores of 2.73 or better. It was felt that a better picture of the sample as a whole, as well as the two treatments and the individual classes, might be obtained if these three children were eliminated from the analysis. Therefore, the first (main) analysis of this study was based on the full sample of 115, and the supplementary reanalysis was based on 112 children.

Pretest achievement/posttest achievement. The regression analysis based on pretest ACH as the aptitude and posttest ACH as the criterion yielded no significant differences between the two treatments or among the six individual teachers, as indicated in Figure 1 and Table 18. All teachers had high positive slopes, showing a high relationship between pretest and posttest ACH across teachers and instructional methods. The re-

TABLE 17

Types of Teaching Behaviors Characterizing Instructional Treatments One and Two According to Percentage of Occurrence of the Behaviors

Treatment One: Teachers (2,3,4) score higher on	Treatment Two: Teachers (1,5,6) score higher on
Direction: Initiates Object: Whole Group Publicity: Publicly Behavior: Provides Information Controls Content: Behavior Attention: Divided	Direction: Responds Object: Single Child Publicity: Privately Behavior: Criticism with explanation Evaluating Giving directions Content: Routine Procedures Attention: Undivided
Complete Patterns	**Complete Patterns**
B. T initiates to single child publicly with moderate controls of behavior, with divided attention.	D. *T initiates to a single child privately evaluating subject matter with undivided attention.
C. *T initiates to single child publicly with harsh control or criticism of behavior, with divided attention.	L. *T responds to single child privately with approval regarding subject matter with undivided attention.
G. T initiates to whole group publicly providing information about subject matter with divided attention.	N. *T noncommunicative, object self, publicly, behavior indeterminate regarding routine procedures with undivided attention.
H. T initiates to whole group publicly asking questions about subject matter with divided attention.	
Partial Patterns:	**Partial Patterns**
P. Moderate control of behavior with divided attention.	R. Evaluates subject matter.
Q. Provides information regarding subject matter.	V. Provides information to single child publicly.
S. Asks questions regarding subject matter with divided attention.	
W. Provides information to whole group publicly.	

*Frequency is rather low across all teachers and therefore may not discriminate as well as other patterns.

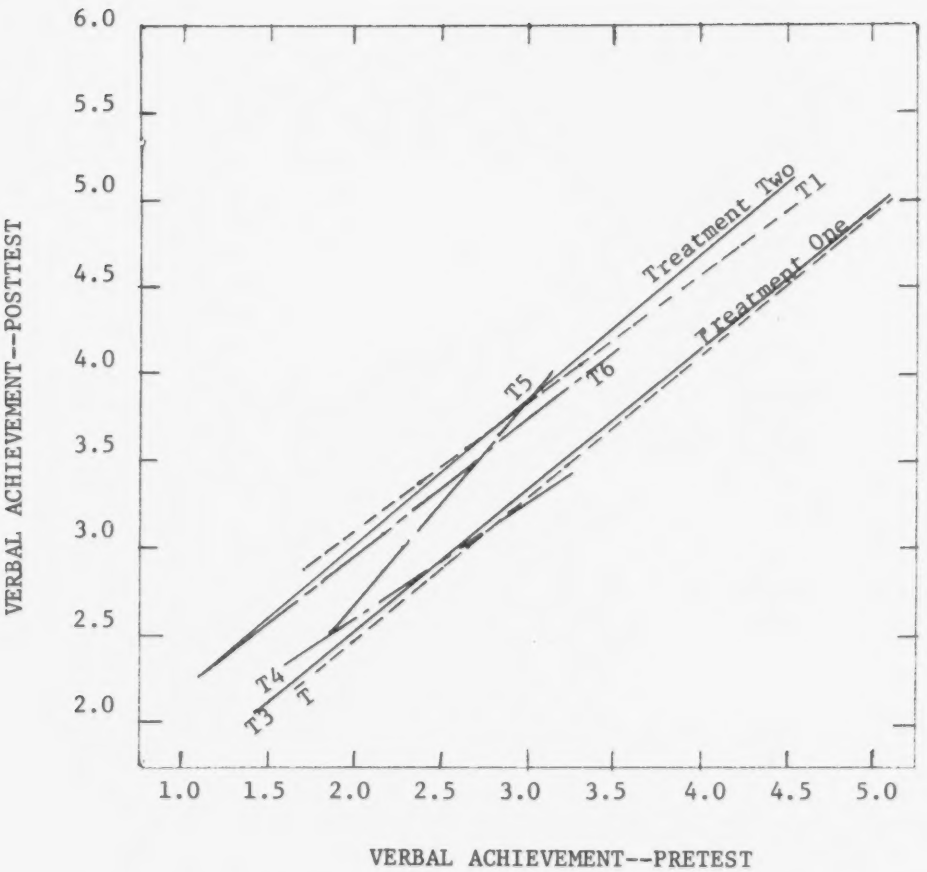

Fig. 1. Regression lines for Treatment One (Teachers 2, 3, and 4) and Treatment Two (Teachers 1, 5, and 6) of the posttest verbal achievement on pretest verbal achievement. N = 115.

TABLE 18

Means, Standard Deviations, Correlations, and Regression Slopes for Posttest Verbal Achievement and Pretest Verbal Achievement

Group	Posttest Achievement		Pretest Achievement		r	Slope*	Slope with outlying cases removed**
	Mean	SD	Mean	SD			
Treatment One (N=56)	2.94	.70	2.46	.74	.82	.78	.77
T2 (N=21)	3.20	.79	2.78	.93	.90	.77	.77
T3 (N=17)	2.79	.60	2.33	.63	.85	.80	.79†
T4 (N=18)	2.78	.60	2.23	.41	.48	.70	.66†
Treatment Two (N=59)	3.49	.72	2.60	.68	.80	.85	.85
T1 (N=21)	3.86	.77	2.96	.78	.78	.76	.77†
T5 (N=16)	3.32	.57	2.46	.42	.80	1.08	1.08
T6 (N=22)	3.27	.66	2.35	.59	.74	.82	.82
All groups combined (N=115)	3.22	.76	2.53	.71	.78	.84	.84

*Test for parallelism of regression: $F_{treatments} = .42$ (df = 1,111), n.s.

**Test for parallelism of regression: $F_{treatments} = .51$ (df = 1,108), n.s.

†The three cases were removed from the classes of T3, T4, and T1.

analysis with the elimination of the three outlying cases made no difference in the slopes on this pairing of variables, as shown in Table 18.

It should be noted that students under Treatment Two (Teachers 1, 5, and 6) started out with a higher mean ACH (2.60) than students under Treatment One (2.46), though all Treatment Two classes did not score higher than all Treatment One classes. Treatment Two classes also had a greater mean gain in ACH (.89 compared with .48). These two findings are reflected in the positioning of the two treatment regression lines and the slightly higher slope for Treatment Two. We can conclude that there may be a slight advantage for students in the more individualized treatment, but the difference is not significant. These results seem to corroborate the findings of Stearn (1964), who reviewed a number of studies on directive versus nondirective instruction: "In general, it would appear that amount of cognitive gain is largely unaffected by the autocratic or democratic tendencies of the instruction" (quoted by Sears & Hilgard, 1964, p. 201). In general, Treatment One teachers could be considered more characteristic of a directive approach, and Treatment Two teachers more characteristic of a nondirective approach.

Pretest self-concept/posttest achievement. The only significant difference between the slopes of the two instructional treatments in the initial (main) analysis occurred with pretest SC as the aptitude measure and posttest ACH as the criterion. This interaction was significant at $p < .01$ (see Figure 2 and Table 19). In this interaction Treatment Two teachers had moderate to moderately high positive slopes (.33, .59, .62), with a combined moderately high positive slope of .63. Treatment One teachers had slopes near zero or moderately high negative (.01, .04, -.60), and a combined slope that was slightly negative (-.08). From this interaction it can be seen that for nearly all children, the higher the self-concept the greater the achievement in classes whose teachers followed a more individualized approach to instruction rather than a whole group approach.

Owing to the scarcity of low SC children in this particular sample, it is impossible to conclude that one of the instructional treatments is more effective for them than the other. Hypothetically, if these classes had more low SC children and the regression lines remained the same, there would be a tendency for the low SC children (those scoring below about 2.75, where the two treatment slopes cross) to achieve better under Treatment One, the more traditional whole-group approach. But only four children in the entire sample have a pretest SC score below 2.75--the three previously mentioned who scored very low, plus one who scored 2.73, just below the 2.75 cutoff point. Thus any conclusions drawn concerning this group of pupils is tentative at best and cannot be generalized. Two classes, in fact (T5, T6), had no pupils below 2.75 in pretest SC. It is clearly evident, nonetheless, that pupils with SC above 2.75 (almost the entire sample) showed greater achievement under the more individualized instruction in Treatment Two. There was a much higher correlation between

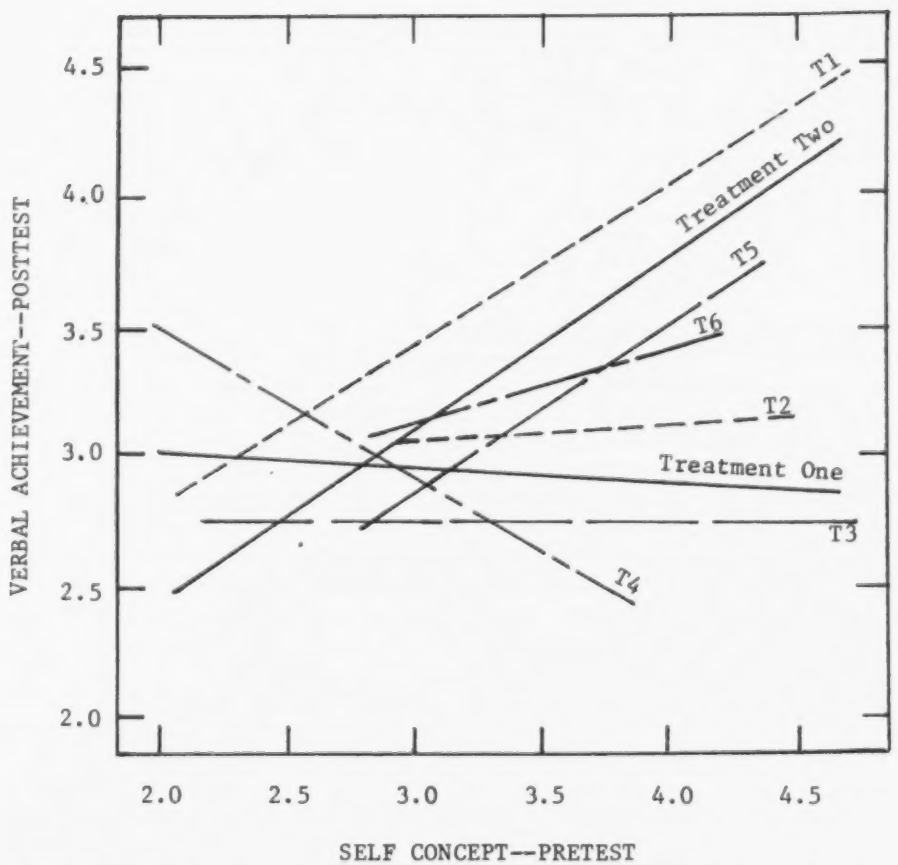

Fig. 2. Regression lines for Treatment One (Teachers 2, 3, and 4) and Treatment Two (Teachers 1, 5, and 6) of posttest verbal achievement on pretest self-concept. N = 115.

TABLE 19

Means, Standard Deviations, Correlations, and Regression Slopes for Posttest Verbal Achievement and Pretest Self-Concept

Group	Posttest Achievement Mean	Posttest Achievement SD	Pretest Self-Concept Mean	Pretest Self-Concept SD	r	Slope*	Slope with outlying cases removed**
Treatment One (N=56)	2.94	.70	3.51	.48	-.06	-.08	-.12
T2 (N=21)	3.20	.79	3.61	.43	.02	.04	.04
T3 (N=17)	2.79	.60	3.58	.53	.01	.01	-.37†
T4 (N=18)	2.79	.60	3.33	.45	-.45	-.60	-.60†
Treatment Two (N=59)	3.49	.72	3.54	.52	.46	.63	.72
T1 (N=21)	3.86	.77	3.71	.62	.48	.59	.76†
T5 (N=16)	3.32	.57	3.56	.51	.56	.62	.62
T6 (N=22)	3.27	.66	3.37	.38	.19	.33	.33
All groups combined (N=115)	3.22	.76	3.53	.50	.22	.34	.41

*Test for parallelism of regression: $F_{treatments} = 7.80$ (df = 1,111), $p < .01$.

**Test for parallelism of regression: $F_{treatments} = 7.98$ (df = 1,108), $p < .01$.

†The three cases were removed from the classes of T3, T4, and T1.

SC and ACH in treatment Two than in Treatment One. The interaction might be better classified as an ordinal rather than a disordinal ATI.

It is notable that there is a high degree of consistency among the slopes of the Treatment Two teachers (Figure 2) and between the slopes of two of the three teachers in Treatment One and the entire Treatment One slope. T4 has a rather high negative slope (-.60). This teacher's behavior was compared with that of the other teachers to see whether there might be any distinguishing characteristics to account for the difference (refer to Tables 3, 4, and 5). With the present measuring instruments, one cannot determine which behaviors of T4 might be related to his negative slope. His strong reliance on whole-group instruction might have inhibited the higher SC children, consequently lowering their ACH motivation. His characteristics of using controls less frequently than the other teachers, expressing approval more frequently, and offering choices more frequently, might have been supportive of the lower SC children, thus contributing to their ACH. There may be other important differences among the teachers not accounted for by the observation techniques or the division into two treatments used here.

In both sets of analyses, tests for parallelism of regression slopes were performed for the three teachers within each treatment group; no significant differences were obtained. We can therefore consider each treatment group as having homogeneity of slopes among its three teachers, a phenomenon that seems to legitimize the comparison between the two treatments. (These results also hold for other variable pairings and will not be discussed in each instance).

Pretest locus of control/posttest achievement. On the whole, the results for the two treatments in the analysis with ACH as the criterion and pretest LOC as the aptitude are similar in direction to the results based on SC as aptitude. The difference between treatment slopes almost reached the .05 level of significance in the initial analysis. All the children, whatever their pretest LOC score, achieved better under the individualized treatment than under the more traditional whole-group treatment. The interaction is thus of the nature of an ordinal ATI. These results are shown in Figure 3 and Table 20.

In general, the slopes for Treatment One teachers are close to zero (ranging from -.02 to .10) and those for Treatment Two teachers are somewhat higher (ranging from .06 to .10). The absolute values of the slopes are low because of a difference in the scaling along the two axes: the LOC axis has many more units than the ACH axis. Even though this difference between the two scales renders the absolute difference in slope sizes rather small, the difference reflected in ACH approaches significance. Correlations between the variables average .25 in Treatment Two and -.10 in Treatment One. In fact, in the reanalysis (see Figure 3 and Table 20) the difference did reach significance at $p < .05$ ($F = 4.92$, $df = 1,108$; $F = 3.93$, $df = 1,110$). This result is evidently due to slightly

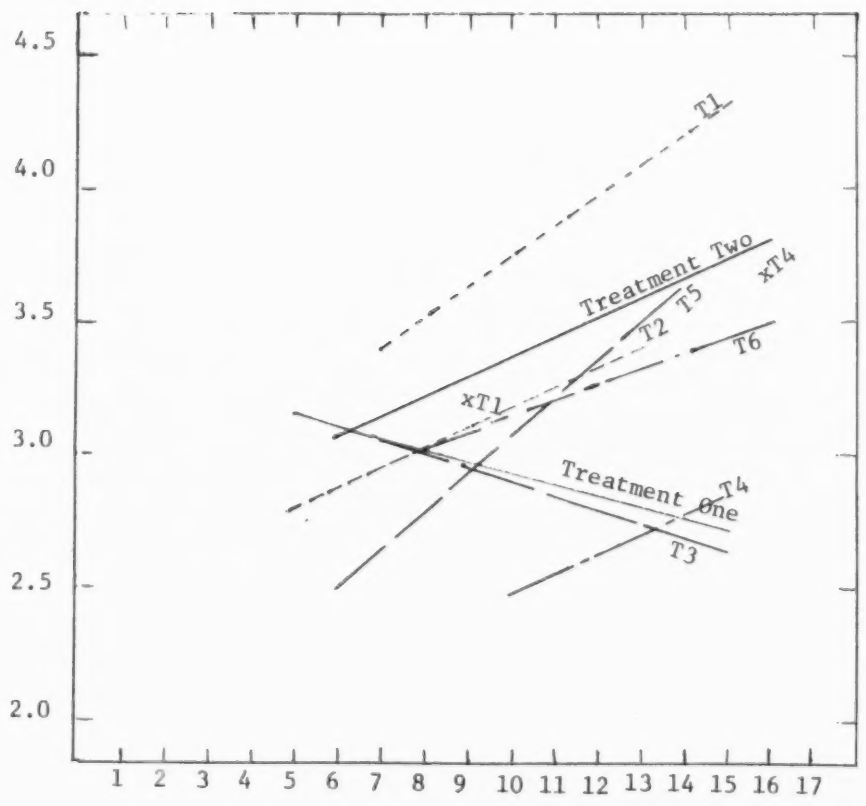

Fig. 3. Regression lines for Treatment One (Teachers 2, 3, and 4) and Treatment Two (Teachers 1, 5, and 6) of the posttest verbal achievement on pretest locus of control based on reanlysis with three outlying cases (denoted by x) removed. N = 112.

TABLE 20

Means, Standard Deviations, Correlations, and Regression Slopes for Posttest Verbal Achievement and Pretest Locus of Control (based on reanalysis with outlying cases eliminated)

Group	Posttest Achievement		Pretest Locus of Control		r	Slope with outlying cases removed*	Slope with all cases included**
	Mean	SD	Mean	SD			
Treatment One (N=54)	2.94	.70	11.28	2.62	-.16	-.04	-.02
T2 (N=21)	3.20	.79	9.10	1.95	.19	.08	.08
T3 (N=16)	2.83	.60	12.19	2.20	-.22	-.06†	-.02
T4 (N=17)	2.73	.58	13.12	1.69	.20	.07†	.10
Treatment Two (N=58)	3.49	.73	11.19	2.28	.25	.08	.08
T1 (N=20)	3.88	.78	10.70	2.39	.37	.12†	.12
T5 (N=16)	3.32	.57	11.13	2.28	.54	.14	.14
T6 (N=22)	3.27	.66	11.68	2.19	.20	.06	.06
All groups combined (N=112)	3.23	.76	11.23	2.44	.03	.01	.02

*Test for parallelism of regression: $F_{treatments} = 4.92$ (df = 1,108), $p < .05$.

**Test for parallelism of regression: $F_{treatments} = 3.75$ (df = 1,111), $p < .10$.

†The three cases were removed from the classes of T3, T4, and T1.

decreasing slopes for both T3 and T4, with the low child in T3 having the low SC, low ACH, and low LOC again making the largest difference, thus substantiating the theory that this particular child is an exceptional case and can be legitimately eliminated from the analysis.

The low intercorrelations of pretest SC and LOC for all children combined indicate that the two measures are relatively independent factors ($r = .14$ for $N = 115$; $r = .17$ for $N = 112$, though Table 2 shows a good deal of variation among classes in the relationship between these variables (for $N = 115$). The results based on these relatively independent pretest variables are therefore of particular interest, since they seem to reflect different aptitudes, as measured in this study, but still interact in a similar way with the different teaching styles. Both were associated more strongly with posttest ACH when teacher behavior was more individualized to the learner than when it was more traditionally aimed at the whole class in general.

Posttest self-concept /three pretest aptitudes. The regression analyses based on posttest SC as the criterion showed no significant differences between the treatment slopes when any of the three pretest variables of ACH, SC, or LOC was used as the aptitude measure. Figures and tables for these results have thus been omitted. It appears that pretest and posttest SC are moderately correlated in both instructional treatments, and that there is no real advantage to either treatment for improving SC in this sample.

Posttest locus of control/three pretest aptitudes. The final series of regression analyses based on posttest LOC as the criterion and the three pretest measures as the predictor aptitude variables again showed no significant differences between the two instructional treatment slopes for any combination of variables. The statistical results have been omitted.

Discussion of aptitude-treatment interaction analyses. Two interactions out of the nine attempted were significant. With pretest SC as the predictor aptitude variable, nearly all pupils had greater ACH in individualized instruction than in whole-group instruction. The difference between the two treatment slopes was significant at the $p < .01$ level. The crossing point of the interaction was at the pretest SC level of approximately 2.75, below which very few cases fell. Practically speaking, then, interaction could be considered more an ordinal than a disordinal ATI. It might be conjectured that on the basis of the regression lines obtained, low SC children learn more easily under whole-group instruction than under individualized instruction. The difference did reach significance at $p < .05$ when the data were reanalyzed without the three outlying cases, owing primarily, it seemed, to one child in T3's class who could legitimately be eliminated as an exceptional case.

In very broad terms, whole-group instruction could be classified as a more structured teaching approach, and individualized instruction as a relatively unstructured and differentiated teaching approach. Cronbach

and Snow (1969) and Sears and Hilgard (1964) have summarized results of various studies showing that children who are emotionally free from anxiety, compulsiveness, and dependence tend to achieve better than less emotionally free students do in an unstructured learning situation, whereas the more compulsive, anxious and/or dependent students do better in a more structured situation. The results of the present analysis can be related in some ways to these general findings.

It seems reasonable to suggest that children with low SC and/or LOC may be more dependent and less confident than children who score high on these measures. One might therefore conjecture that children with low SC and/or LOC would achieve more with the support provided by structured teaching. Those with high SC and/or LOC would have more confidence and possibly more emotional freedom to provide their own structure; hence they would be able to thrive under more unstructured teaching. In fact, for the latter type of children, too much structure might be a hindrance, since it might decrease their motivation to achieve. In the present analyses for both SC and LOC, the higher children scored on these measures, the greater their achievement was under the less structured individualized treatment as opposed to the generally more structured whole-group treatment. No conclusive results can be derived from the present analysis concerning low SC children because there were too few children in the sample with very low scores. It can be seen, however, that the type of instruction did make less difference in the achievement of children who scored relatively low on these measures. There is some indication that the children with quite low SC might make better progress in a more structured (whole-group) situation, but more such cases need to be studied before such a generalization can be made with confidence.

One might hypothesize from the results of this analysis concerning SC and internal LOC as predictors of ACH, that if a teacher could first successfully help a child increase his SC and internal LOC, then this child might benefit more in the long run from a more individualized instructuional approach. Another hypothesis is that SC and LOC as criterion variables would be higher under more individualized as opposed to whole-group instruction. This prediction was not supported by the analyses in this study, but it might be a fruitful subject for further investigation.

EVALUATION AND DISCUSSION

As a rationale for this study, the child variables selected as dependent variables represented certain objectives of elementary education.

We share with other educators a reluctance to take achievement-test scores as the only meaningful measure of the effectiveness of the education assimilated by the child; but like other researchers in education we take these fairly objective scores as one index of outcome, if the tests are reasonably representative of what has been taught during the year. Clearly

the content of teaching could be improved in the vast majority of classrooms throughout the country, especially in those serving the children of poor families, and with changes in content, changes in the tests will be required. Moreover, it is thought that developing a child's favorable concept of himself as a learner is both a worthy objective in its own right and a means of facilitating and promoting learning. A favorable self-concept should be manifested in effort, attention, confidence in approaching work, pleasure in coming to school, and an absence of anxiety about learning tasks. It is expected that such behavior will facilitate achievement as measured by tests. The same could be said for developing a child's belief in internal locus of control.

It may well be that for each child there is an optimum level attainable on each of the three variables studies here--prior achievement, self-concept, and belief in internal locus of control. Of course, the child's intelligence and earlier educational background must modify all three variables. For example, the child who is impelled to strive for achievement much beyond his capabilities probably pays for his overachievement with a loss of self-esteem and sense of efficacy. On the other hand, a highly favorable self-concept that is not realistically tied to feedback of performance has been observed to result in an attitude of smugness with reduced effort at learning and less subsequent achievement, unless the curriculum is especially challenging. Furthermore, excessive belief in one's own responsibity for successes and/or failures may make one unreceptive to the suggestions of others even when events are truly beyond one's control. In all these cases, one would expect the motivational effect to be less facilitating than in the optimum situation. If a very high score on any of the variables is not necessarily more helpful than a moderately high score, relationships among the three variables may not be linear. Furthermore, the balance between variables may sometimes have a mitigating effect: for example, a high degree of belief in internal control may sometimes compensate for a below-avergage level of achievement or self-concept.

Coopersmith,(1959, 1967) has attempted to adjust for such problems by considering correlates of different combinations of high and low self-concept, measured both by self-report and by behavioral manifestations as rated by the teacher. The value of the correlational analyses, including the stepwise regression and aptitude-treatment interaction, may be limited by the problems mentioned. It may be that multivariate analyses (for example, an analysis taking into account low initial achievement, low self-concept, high belief in internal control) are required.

Our results from three methods of data analysis (simple correlations, stepwise regression, and aptitude-treatment interaction) will be considered in relation to each of the predictions made earlier.

The truth of hypothesis 1 (see page 14),involving the effect of pretest achievement on posttest achievement is, of course, self-evident. For the total sample of 115, the correlation of pretest with posttest is .65;

for the sample of 72 used in the stepwise regression analysis, it is .81. The difference between the two samples was that the second included only children for whom complete data were available. Absences from school and transfers from one class to another probably accounted for most of the attrition. Missing data were especially prominent in Class 4, for whom the pretest-posttest correlation was .48. For the other five classes the correlation was above .74.

Hypothesis 2 required examining the posttest achievement of the children whose initial scores on self-concept and belief in internal control were below the median of their class. Children low on both measures showed poor achievement gains compared to those high on one or both. These children may have lacked the energy, motivation, or will to profit much from their third-grade experience, at least as far as verbal achievement was concerned. Over the four quadrants of lower-achieving children, those high in internal control scored higher on posttest achievement.[1]

Hypothesis 3 suggests that for children with relatively high pretest achievement as compared to those with lower pretest achievement, self-concept and belief in internal control will carry less weight in predicting later achievement. This hypothesis was tentatively confirmed by the quadrant analysis.

Hypothesis 4 predicted moderate positive relationships between posttest achievment and both self-concept and belief in internal control. Self-concept correlated .17 with achievement in the total sample, but the correlation between belief in internal control and achievement was close to zero. The latter finding is contrary to the findings of McGhee and Crandall (1968), who have generally found some positive relationship between belief in internal control, and achievement in Midwestern children of middle-income families. Neither self-concept nor belief in internal control reached sufficient levels of significance to enter into the regression analysis involving 72 children, though in the total sample of 116 self-concept pretest correlated .17 with pretest achievement and .24 ($p < .01$) with posttest achievement. The latter figure bears out the findings of previous research using similar and different measures of self-concept (Bledsoe, 1967; Brookover, 1964; Campbell, 1967).

The measure of belief in internal control used here differs in format, though not in conceptual background, from that used by Crandall et al. Crandall found in her sample, as we did in ours, that answers were considerably skewed toward the internal control end of the dimension. Out of 16 possible internal or external responses on the Hess-Shipman scale used here,

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[1]These results (termed quadrant analysis), which compare results for children differing in combinations of high or low pretest scores on achievement, self-concept, and locus of control, have been omitted from the report. The data are available on request from the senior author.

the internal control mean was close to 12, with a standard deviation of approximately 2. Third graders on the Crandall scale scored a mean of 23 out of a possible 34, with a standard deviation of 4. The proportions are almost identical. This narrow variability leaves little room for distinguishing individual differences. The influence of social desirability on children's responses may be greater for this instrument than might be desired, although Crandall et al. (1965) found only a slight relationship between internal locus of control and social desirability, using instruments she devised for each measure.

Hypothesis 5, predicting that self-concept and belief in internal control would be positively related, is not confirmed for the total sample of 115 children: correlations were .14 at pretest and .08 at posttest. Analysis based on the sample of 72 children showed a very low correlation of .04 between self-concept posttest and I-, the belief in one's own responsibility for failures. Neither I+ nor total belief in internal control in relation to self concept reached sufficient levels of significance to enter into the regression analysis. For the aptitude-treatment interaction (N = 112) the correlation was .17. Across the six classes the correlation between self-concept and belief in internal control generally declined from pretest to posttest. For Class 4, however, it increased to a significant .44. This class was especially interesting in terms of teacher behavior, as will be described.

The preceding discussion has considered relationships among scores on the three chief measures obtained from the children: verbal achievement, self-concept, and belief in internal control of reinforcement. When each of these is taken as a target or outcome measure, one may ask what kinds of teacher behavior tend to facilitate each. This question has been examined (1) by simple rank-order correlations between single categories and patterns (combinations of single categories) of teacher behavior, taken over the six teachers of this sample, (2) by stepwise regression analyses, in which both teacher behavior and child measures (aptitudes) were entered into the regression, and (3) by aptitude-treatment interaction, in which two more general teacher styles, each involving a number of categories of classroom behavior, were contrasted for possible interactions between learner aptitudes and instructional treatments. Results for Hypothesis 6 (page 14), which predicted that certain teacher behaviors would be associated positively or negatively with achievement in the children, will be considered in order of the three methods of analysis.

For the most part, the predicted relationships did hold when teacher behavior, both in single categories and in patterns, was correlated with posttest achievement. Higher achievement was associated with the following behaviors: teacher interaction with a single child rather than the whole group, private as compared to public interaction, low emphasis on controlling behavior, and more evaluation of children's work. Not confirmed were the predicted positive effects of the following teacher behaviors on children's achievement: a relative emphasis on approval of children's work, and responding or listening to children as compared to initiating to them. Subject matter rather than behavior as the content of the interaction appeared positively associated with achievement in some of the patterns, as did teacher behavior of providing information.

The stepwise regression analysis did not permit the influence of teacher behavior to emerge to a great extent, since much of the variance in posttest achievement was a function of pretest achievement (r between the two was .81). Pattern V--providing information to an individual publicly--did appear as a small contributor to the variance in posttest achievement. The multiple R involving 49 variables, was .90.

When pretest achievement was used as the aptitude, and posttest achievement as the criterion in the aptitude-treatment interaction analysis, the results did not discriminate among the two treatments or the six teachers. All teachers had high positive slopes that indicated, as expected, a high positive relationship between pretest and posttest achievement across teacher and instructional methods.

With self-concept as the aptitude variable, however, a significant interaction with treatment was found, using posttest achievement as the criterion variable. The higher the self-concept, the higher the achievement in classes whose teachers followed a more individualized approach to instruction (Treatment Two) rather than a whole-group approach (Treatment One). In addition to scoring high on individualized interactions, the teachers in Treatment Two scored higher than those in Treatment One on responding as opposed to initiating to children, speaking privately to a single child, using criticism with explanation, evaluation, and giving directions about routine procedures with undivided attention. Most of these behaviors had been predicted to be associated with higher child achievement, and these relationships did appear in the rank-order correlations over the six teachers.

Now the influence of self-concept on achievement becomes clearer. The teachers in Treatment Two appeared to be businesslike, organized, and less in need of resorting to controlling behavior than those in Treatment One. They probably spoke to individual children in terms of their knowledge of the individual characteristics and past work of the child. In this way they may have been more informative in their criticism and evaluation of a child's work than Treatment One teachers, who did not tailor their interactions to individuals as much. A child with a sturdy self-concept can profit, achievement-wise, from this approach. To a child with less confidence in himself, such a teaching style may appear demanding and may produce anxiety that can interfere with achievement. The individualized approach may mean to the child that the teacher has his "number," that he cannot relax under the cover of being part of a large group when the teacher is attempting to instruct as a whole. Note that extending approval of a child's work and listening to a child were more frequent behaviors in all Treatment Two teachers as compared to Treatment One teachers though it had been predicted that these behaviors would also appear related to greater achievement. Both of these categories of behavior were highest in Teacher 4, a whole-group style teacher who was assigned to Treatment One. She also scored high for her treatment group on offering choices to children and developing the idea of equality. This teacher was

the only one of the six whose class provided a high negative slope in the interaction using pretest self-concept as the aptitude and posttest achievement as the criterion. In her class children with initially low, rather than high, self-concepts scored better on end-of-year achievement.

Treatment Two teachers all had rather high positive slopes in this interaction, while two of the three Treatment One teachers had slopes close to zero, with Teacher 4 highly negative, as we have seen. The two treatment slopes crossed at a point below which there were very few children with lower self-concept scores, so that generalizations about favorable treatment methods for low self-concept children are not really in order. However, the suggestions made above involving whole-group instruction as providing something of a protective cover for low self-concept children, especially when combined with teacher behaviors of extending approval, listening, and offering choices to children, are provocative enough to be worth testing on a larger sample of teachers and children.

It should be noted that our use here of the term individualized instruction assumes that the teacher is mainly interested in the academic aspects of the child's work rather than in his feelings. Some teachers with clear individualized styles temper their interactions with certain children in the light of their knowledge of the child's feelings about himself and his capability for academic work. Thus they may counsel and encourage the low self-concept child while being more demanding of the high self-concept child. With this teacher style one would expect less interaction between self-concept and achievement, with both low and high self-concept children gaining well on achievement. Some indirect corroboration for this idea appears below, where the results using self-concept as the criterion variable are presented.

With posttest achievement again as the criterion variable and belief in internal control of reinforcement (locus of control) as the aptitude, the results are in many ways similar to those just cited with self-concept as the aptitude. This is the case despite the fact that self-concept and locus of control are not strongly related (.14 at pretest, .08 at posttest). Children with relatively high locus-of-control scores made better achievement gains under the individualized Treatment Two than under the more traditional whole-class method of Treatment One: correlations between achievement and internal control averaged .25 in Treatment Two but -.10 in Treatment One.

Hypothesis 7 concerns the effects of teacher behavior on end-of-the-year self-concept. It was predicted that posttest self-concept would be higher in children whose teacher scored relatively high on displaying the following behaviors: responding and listening to children as compared to initiating; giving approval; offering choices; developing a child's idea; suggesting equality rather than emphasizing controls; and responding or listening to a single child with approval about subject matter. From the rank-order correlations of teacher behavior with end-of-year total self-

concept, none of these predictions was confirmed. However, Partial Pattern U--giving public approval to an individual child--was significantly related to the self-concept subscale of divergent thinking, which rates the child's feelings of confidence on having unusual and original ideas.

Actually, correlations for several teacher behaviors were close to significance in the direction opposite from the predictions made in Hypothesis 7. These included the teacher behavior of initiating to children rather than responding and that of using moderate behavior controls while having divided attention. Both of these teacher behaviors correlated positively with posttest self-concept. Unexpected significant correlations occurred when the teacher directed her interaction to a small group rather than to an individual or the whole group (positive) and gave criticism with an explanation (negative). Pattern I--teacher initiating to the whole group publicly, giving directions about routine procedures with undivided attention--correlated negatively with self-concept, as predicted.

Predictors of posttest self-concept from the stepwise regression analysis suggested explanations for the outcomes mentioned previously. Significant predictors included two teacher behaviors: first, teacher criticism with explanation which carried negative weight with self-concept; and second, Teacher Pattern L, in which approval is given privately to the individual. The latter at first entered as a negative factor, but when teacher criticism with explanation was included in the analysis, Pattern L became positively related to higher self-concept, as expected. There was a positive correlation between the two behaviors, and Treatment Two teachers scored higher on both. This finding may be interpreted as indicating that criticism with explanation is less damaging to children's concepts when balanced sufficiently with approval. Considering the total group of subjects, it appeared that children tended to perceive criticism with explanation as deprecating to their self-concepts, but individual approval as supportive. Criticism with explanation has been defined as negative statement accompanied by rationale or alternative, e.g., "No, that's wrong. If you do it that way, the numbers won't add up." It would appear to be a useful corrective feedback device, and it did appear as a positive factor in the styles of Treatment Two teachers, for whom children with higher self-concepts scored better in end-of-year achievement. Possibly children with initially high self-concepts can generally accept such criticism more readily and put it to use in their thinking, whereas for those less comfortable with themselves, it seems to be further evidence of their own incompetence.

Two other predictors of total self-concept do not involve teacher behavior but involve perceptions of the child as a member of his peer group. Each child was rated in January by his teacher on social adjustment. The definition of social adjustment was as follows: "Children high on this dimension get along well with teachers and other children. They can stand up for their own rights without getting into squabbles. They do

not dominate other children, although they may be leaders, and they are not dominated by others. They have at least one good friend. Their relationship with the teacher is friendly." High ratings on this scale by the teacher contributed significantly to the prediction of a child's posttest self-concept. And the child's own perception of how well classmates liked him (social distance--self) carried considerable weight in the posttest self-concept. These two factors emphasized the importance, for self-concept, of the child's relationship with his peers in contrast to the factors contributing to the prediction of verbal achievement. It is perhaps encouraging to note that pretest self-concept carried much less weight in predicting posttest self-concept than did pretest achievement in predicting posttest achievement. Self-concept may be viewed as being more amenable to change by situational factors than achievement is. The variables included in the final result of this regression analysis, however, did not account for a great deal of the variance in self-concept (56 percent). More remains to be learned about (a) the situational factors in the classroom that influence such feelings about the self, and (b) fidelity of self-report, in terms of the effects of anxiety, self-deprecation, and self-aggrandizement.

The foregoing discussion has considered the total self-concept score, a sum of scores on nine subscales, as the criterion variable. One of these subscales, the self-concept for divergent thinking is especially interesting. Typical items for this subscale, on which the child rates himself, are "Letting my imagination go when I want to" and "Being interested in new things; excited about all there is to learn." Teacher behavior of approval, as predicted, related well to self-concept in this area. Evidently a tolerant climate encourages the child who thinks he can enjoy different ways of thinking about things.

The aptitude-treatment interaction and analyses were set up to distinguish types of teacher behavior with achievement, rather than self-concept, as the criterion. When self-concept was taken as the criterion, using the two treatment groups established for achievement, the results were nonsignificant. The two treatment groups differed in the relationship between self-concept and achievement: -.06 for Treatment One and .46 for Treatment Two. There was a tendency for the children with higher achievement to have higher self-concept scores in Treatment Two, and for those with lower achievement to have higher self-concept scores in Treatment One. This finding confirms earlier results, and Hypothesis 4 for Treatment Two classes only. The teacher behavior of giving approval, which has been shown to bear some relationship to self-concept, was not a part of the teaching styles that differentiated the two treatments. Teachers 1, 4, and 6 scored highest on approval, and Teacher 5 scored next highest (the Treatment Two teachers were 1, 5, and 6).

In sum, the present results on a small sample of teachers and classes do not give much support to the idea of an all-around teacher who can

raise children's self-concepts while also facilitating good achievement gains. Purkey (1970) suggests that such teaching is possible, at least for bright children, citing Frankel (1964). The present results also suggest some success in reaching both objectives with children who, if not really talented, are already doing well academically. These results also underscore another point of Purkey's: "The self is remarkably conservative, and once a child has formed a negative image of himself as a learner, the task of the teacher becomes extremely difficult. Therefore, the prevention of negative self-concept is a vital first step in teaching" (p. 43).

Some of the predictions made in the present study were suggested by the studies of Spaulding (1964) as well as by earlier works of Sears (1963). The teachers observed in these earlier studies were from typical modern suburban schools, and the children were generally above average in intelligence and economic background. The present results, based on observations of children who are mainly black and from lower-income families, are generally somewhat different from the earlier results with reference to self-concept predictors. In order to draw legitimate conclusions on the effect of teacher behavior on such children's self-concepts, it will be necessary to replicate the study with a larger sample of teachers and students having the same general background.

Hypothesis 8 predicted that certain teacher behaviors would be associated with children's belief in internal control of reinforcement (locus of control). Here it was expected that higher internal control scores would obtain in children whose teachers scored relatively high on: (a) responding and listening to children as opposed to initiating to them; (b) offering choices, developing a child's ideas, suggesting equality as compared to exercising control frequently; (c) responding or listening to a single child with approval about subject matter. Direct and frequent approval was thought to be less important in developing belief in internal control than in developing self-concept.

Results from the rank-order correlations confirmed both the single-category listening relationship and teacher pattern M--listening to a single child with approval about subject matter--as being associated with belief in internal control. A teacher taking time to listen, rather than taking the dominant role in initiating, evidently helps children feel that their ideas are respected and thus increases their sense of personal control of the environment. Not surprisingly, this effect is intensified if the teacher not only listens but listens with approval.

Instances of the teacher behaviors of offering choices, developing a child's idea and suggesting equality were rare in this sample, and predictions based on these variables were not confirmed. Frequency of approval was thought to promote a kind of dependence on the teacher as reinforcing agent, and hence to be less effective in promoting dependence on the self. The correlation between teacher approval and belief in internal control was .70, however.

Two other teacher behaviors that were not included in predictions about posttest locus of control approached significance in the negative direction: criticism with explanation, and evaluation. If one thinks of the teacher as an authority in checking on work, which is involved in both of these behaviors, it is easy to see, post hoc, that this situation removes the child as the controller of his success or failure and substitutes the teacher. These two behaviors also appeared as negative factors in predicting posttest self-concept. Possibly stronger self-concepts and belief in internal control will be developed in children if teachers permit them, whenever possible, to evaluate their own work for themselves and figure out for themselves the explanation for their mistakes.

The regression analysis showed the teacher behavior of criticism with explanation to be not quite significant by the F test, but the correlation with internal control was -.31, and it contributed 2 percent to the prediction of belief in internal control. Ten percent of the variance was accounted for by the child's popularity with his classmates, the social distance (liking by others) measure. Also contributing positively was the teacher rating of the child on the social scale, which appeared as a positive factor in the prediction of self-concept as well. Curiously, the teacher rating of the child on the emotional scale appeared as a negative factor in this analysis. The definition of this scale involves sensitivity, having a good sense of humor, taking responsibility seriously, and lack of anxiety. Why teachers should perceive children who scored high on belief in internal control as low on this scale is a puzzle. But the other factors make sense: an environment of teacher-classmate approval facilitates a child's ability to take responsibility for what happens to him. The total variance predicted was not large, however, (44 percent), and other variables must be sought that may influence children's perceptions of their own control over their environment.

Although the amount of variance contributed by the teachers' behavior to the children's achievement, self-concept, and belief in internal control of reinforcement was not overwhelming in this small sample, it was significant enough to warrant further study. If these teacher styles can be shown, on replication, to be at least partial contributors to children's motivational and educational development, it will be worth considerable effort to discover methods of teacher education that will bring about such beneficial behavior in teachers. In the absence of controlled procedures for such training, we are left at the mercy of the chance wit and wisdom of individual teachers to discover how to reproduce these effective methods. Since the influence of teacher behavior on children has now been shown to be modest but distinctly significant, new efforts are due for the important task of discovering how to manipulate the antecedent variables.

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APPENDIXES

Appendix A-1
Self-Concept Scale

STANFORD CENTER FOR RESEARCH AND DEVELOPMENT IN TEACHING--SCHOOL OF EDUCATION

Name_____Boy_____Girl_____ Grade_____

Teacher_____

Some boys and girls have thought about the things they do and decided that the items on these pages were helpful in thinking about themselves. This is a chance for you to look at yourself and decide what your strong points are and what your weak points are. This is not a test; we expect everyone to have different answers--so be sure your answers show how you think about yourself. Your answers are private and will be kept in confidence.

Read each item and then answer the questions: Compared with other boys and girls my age, how do I rate now?

Find the line under whatever heading indicates your answer. (The words at the top show what the lines in each column stand for.) Mark an X on that line. Now go right ahead. Work as fast as you like.

	Excellent	Very good	Better than most	OK	Not so good
1. Being good at sports	-----	-----	-----	-----	-----
2. Learning things rapidly	-----	-----	-----	-----	-----
3. Making friends easily with my own sex	-----	-----	-----	-----	-----
4. Having new, original ideas	-----	-----	-----	-----	-----
5. Getting my school work done on time and not getting behind	-----	-----	-----	-----	-----
6. Being able to read well	-----	-----	-----	-----	-----
7. Being a good size and build for my age	-----	-----	-----	-----	-----
8. Remembering what I've learned	-----	-----	-----	-----	-----
9. Being willing for others to have their way sometimes	-----	-----	-----	-----	-----
10. Solving problems in ways others haven't tried.	-----	-----	-----	-----	-----
11. Being confident, not shy nor timid	-----	-----	-----	-----	-----
12. Knowing how to do math	-----	-----	-----	-----	-----
13. Being good at things that require physical skill	-----	-----	-----	-----	-----
14. Being a good student	-----	-----	-----	-----	-----
15. Being a leader--one to get things started with my own sex	-----	-----	-----	-----	-----
16. Thinking up answers to problems--answers no one else has thought of	-----	-----	-----	-----	-----
17. Being able to concentrate	-----	-----	-----	-----	-----
18. Being interested in science; learning about things that scientists do	-----	-----	-----	-----	-----

	Excellent	Very good	Better than most	OK	Not so good
19. Being attractive, good looking	-----	-----	-----	-----	-----
20. Having brains for college	-----	-----	-----	-----	-----
21. Making other people feel at ease	-----	-----	-----	-----	-----
22. Learning about new things even when other people aren't interested--studying about things on my own.	-----	-----	-----	-----	-----
23. Getting a lot of fun out of life	-----	-----	-----	-----	------
24. Writing creative stories and poems	-----	-----	-----	-----	-----
25. Being a good athlete	----	-----	-----	-----	-----
26. Being able to apply what I've learned	----	-----	-----	-----	-----
27. Having plenty of friends of my own sex	----	-----	-----	-----	-----
28. Seeing new ways of thinking about things and putting ideas together	-----	-----	-----	-----	-----
29. Spending most of my time on my work, not goofing off	-----	-----	-----	-----	-----
30. Having good handwriting even when I'm hurried	-----	-----	-----	-----	-----
31. Being not too skinny, not too fat	-----	-----	-----	-----	-----
32. Having brains	-----	-----	-----	-----	-----
33. Being sensitive to what others are feeling	-----	-----	-----	-----	-----

	Excellent	Very good	Better than most	OK	Not so good
34. Being able to see things in my mind easily when I want to	-----	-----	-----	-----	-----
35. Being able to change things when they don't suit me	-----	-----	-----	-----	-----
36. Being able to spell correctly	-----	-----	-----	-----	-----
37 Enjoying games & sports	-----	-----	-----	-----	-----
38. Being smart	-----	-----	-----	-----	-----
39. Being active in social affairs with my own sex	-----	-----	-----	-----	-----
40. Being interested in new things; excited about all there is to learn	-----	-----	-----	-----	-----
41. Well organized; having materials ready when needed	---	-----	-----	-----	-----
42. Learning about people around the world and being interested in them	----	-----	-----	-----	-----
43. Having nice features (nose, eyes, etc.)	-----	-----	-----	-----	-----
44. Knowing what to do for the right answer to a problem	-----	-----	-----	-----	-----
45. Being easy to get along with	-----	-----	-----	-----	-----
46. Letting my imagination go when I want to	-----	-----	-----	-----	-----
47. Enjoying myself in school	-----	-----	-----	-----	-----
48. Doing well in art work, painting or drawing	-----	-----	-----	-----	-----

Appendix A-2
Self-Concept Score Sheet

Child's Name_____Teacher_____School_____

Scorer_____Date_____

STANFORD CENTER FOR RESEARCH AND DEVELOPMENT IN TEACHING

The Self-Concept Score Sheet

Items	Physical ability	Attractive appearance	Convergent mental	Social relations same sex	Social virtues	Divergent mental	Work habits	Happy qualities	School subjects		Total
1-6	1)		2)	3)		4)	5)		6)		
7-12		7)	8)		9)	10)		11)	12)		
13-18	13)		14)	15)		16)	17)		18)		
19-24		19)	20)		21)	22)		23)	24)		
25-30	25)		26)	27)		28)	29)		30)		
31-36		31)	32)		33)	34)		35)	36)		
37-42	37)		38)	39)		40)	41)		42)		
43-48		43)	44)		45)	46)		47)	48)		
Total											
No. Items	4	4	8	4	4	8	4	4	8		48
Average											

Excellent = 5 Better than most = 3 Not so good = 1

Very good = 4 OK = 2

Appendix A-3
Locus-of-Control Scale
STANFORD CENTER FOR RESEARCH AND DEVELOPMENT IN TEACHING

LOC

Name_____ Boy or girl_____

School_____

1. Why do you think your marks went up this year?
   a. The teacher likes me.
   b. I tried harder this year.
2. Why don't you remember these words?
   a. I didn't learn them.
   b. The words were too hard.
3. How come you got 100 in the spelling test?
   a. I studied hard.
   b. The test was easy.
4. Why did the teacher move you out of our group?
   a. She doesn't like me.
   b. I didn't do my work right.
5. Why did the teacher say your work is very good?
   a. The teacher said it to be nice.
   b. Because I worked very hard.
6. Why couldn't you do the arithmetic problem?
   a. I didn't study.
   b. The problem was too hard.
7. Why did you get a smiling face on your paper?
   a. Because I did a good job.
   b. Because the teacher likes me.
8. Why did the teacher say you didn't do very well today?
   a. Because the teacher was mad at me.
   b. My work was very sloppy.
9. Why couldn't you spell the word when the teacher called on you this morning?
   a. The word was too hard.
   b. I didn't do my homework.

10. How come you weren't invited to John's (Mary's) party?
    a. He (she) doesn't like me.
    b. I was mean to him (her).
11. Why don't you remember these words?
    a. I didn't learn them.
    b. The words are too hard for me.
12. How come you're captain of the team?
    a. Because I play very well.
    b. The teacher just picked me.
13. Why did the teacher pick you to lead the line?
    a. Because I was good in class today.
    b. Because I'm tall.
14. Why is she (he) always mean to you?
    a. Because I'm not nice to him (her).
    b. Because he (she) doesn't like me.
15. Why did your group win the game?
    a. The other team was bad.
    b. We played very well.
16. Why couldn't you do the arithmetic problem?
    a. I didn't study.
    b. The problem was too hard for me.

Appendix A-4

STANFORD CENTER FOR RESEARCH AND DEVELOPMENT IN TEACHING

Key for Locus of Control

Teacher_____School_____Scorer_____

		I+	I-	Total I	E+	E-	Total E	Paired Items Agreements	
Student's Name	Possible	7	9	16	7	9	16	2,11	6,16

Appendix A-5

Social Distance Scale

	Would like to have him as one of my best friends	Would like to have him in my group but not as a close friend	Wouldn't mind being with him once in a while but not often nor for a long time	I would rather not have anything to do with him
Weight	4	3	2	1
Name of each child in class on separate line (including his name)				

Liking for others = sum of nominations x weight for each child's response to the class.

Liking by others = sum of nominations x weight for each child as rated by class-Mates.

Self-rating = how each child perceived that others would rate him.

Appendix B-1

Procedure for Use of the Behavior Observation Schedule

Use: The observation schedule can be used by one observer to record teacher behaviors interacting with one or more children and the child(ren)'s response (Teacher--Object of Interaction Observation) and, if desired, can also be used at the same time by another observer to record the simultaneous child behaviors in a classroom as the children interact with other children, the teacher, or remain noncommunicative. Data from the other two types of observation may be coordinated through time notations at the beginning of each round of observation by each observer.

Teacher--Object of Interaction Observation:

1) The observation for the first round involves the first complete behavioral action (usually interaction) of the teacher that is observed. If the teacher interacts with one or more children, the first round of observation also includes the child(ren)'s behavior in the interaction. When the teacher begins a second set of behavior, the point sample or round of observation is completed. The observation should be of sufficient length to allow the description of the (teacher's) direction of the interaction, its object, the publicity involved, the precise behavior and its content, and finally the degree of attention involved. Moreover, the child(ren)'s direction in the interaction, the object of attention, the observed content, affect, and motivation of the action are also noted before actual recording of any information begins. Time required: 30-45 seconds average.

2) Record data for the teacher and object of interaction immediately after each round of observation. Choose the appropriate numeral at the side of each item of the observation schedule that describes the observed behavior within each major "column" (Teacher: Column 1, Direction; Column 2, Object; Column 3, Publicity; Column 4, Behavior; Column 5, Content; Column 6, Attention/Child Object; Column 7, Direction; Column 8, Object; Column 9, Content; Column 10, Affect; Column 11, Motivation and write each number immediately in its appropriate "Major Column" on the accompanying score sheet. Return to observation (above) and continue procedure for the desired number of rounds.

3) Illustration.

In round #1, the observer sees one complete teacher-object interaction and determines that teacher initiated to a single child publicly with short criticism about his subject matter. The teacher had divided attention. The single child responded to the teacher's criticism by continuing to look at his work, complying with the teacher's inferred correction with observed negative effect.

The observer records the following information on the score sheet:

	Teacher							Child				
Column 1	1	2	3	4	5	6	/	7	8	9	10	11
Round #	1	5	9	27	33	40		42	46	49	57	63

Child--Object Observation:

When recording sample child behavior alone, observe child as he is noncommunicative or in interaction with at least one other child or the teacher. Record behavior for sample child from Child side of observation schedule only (the right side listing of behaviors) in the same manner as described in the previous sections.

Appendix B-2

Categories for Behavior Observation

Teacher

(Col. 1) Direction
- 1 (0) Initiates
- 2 (1) Responds
- 3 (2) Listens/watches
- 4 (3) Noncommunicative

(Col. 2) Object
- 5 (0) Single child
- 6 (1) Small group
- 7 (2) Whole group
- 8 (3) Himself

(Col. 3) Publicity
- 9 (0) Publicly
- 10 (1) Privately
- 11 (2) Indeterminate

(Col. 4) Behavior
- 12 (0) Provides information
- 13 (1) Simple approving statement
- 14 (1) Develops student idea
- 15 (1) Recognizes abilities, interests
- 16 (1) Recognizes improvement
- 17 (1) Recognizes effort;encouragement
- 18 (1) Recognizes feelings
- 19 (1) Recognizes individual initiative
- 20 (2) Asks question/elicits response
- 21 (3) Offers choices
- 22 (3) Asks student to develop idea
- 23 (3) Suggests equality
- 24 (4) Gives directions
- 25 (5) Controls, moderate
- 26 (6) Controls, harsh
- 27 (6) Short criticism
- 28 (7) Criticism with explanation
- 29 (6) Harsh criticism
- 30 (8) Evaluating
- 31 (9) Transition behavior
- 32 (9) Indeterminate

(Col. 5) Content
- 33 (0) Subject matter
- 34 (1) Performance goals
- 35 (2) Routine procedures
- 36 (3) Behavior
- 37 (4) Personal qualities
- 38 (5) Human relations
- 39 (6) Indeterminate

(Col. 6) Attention
- 40 (0) Singular
- 41 (1) Divided

Child

(Col. 7) Direction
- 42 (0) Initiates
- 43 (1) Responds
- 44 (2) Noncommunicative

(Col. 8) Object
- 45 (0) Single child
- 46 (1) Group
- 47 (2) Teacher
- 48 (3) Teacher/task
- 49 (4) Himself/task

(Col. 9) Content
- 50 (0) Work
- 51 (1) Nonwork
- 52 (2) Vacant
- 53 (3) Indeterminate

(Col. 10) Affect
- 54 (0) Enthusiastic
- 55 (1) Positive, normal interest
- 56 (2) Neutral
- 57 (3) Embarrassed, uncomfortable, shy
- 58 (4) Negative, displeased
- 59 (5) Hostile
- 60 (6) Indeterminate

(Col. 11) Motivation
- 61 (0) Affiliation, social
- 62 (1) Curiosity, learning, achievement
- 63 (2) Following directions
- 64 (3) Compliance
- 65 (4) Disruptive
- 66 (5) Unhappiness
- 67 (6) Escaping boredom
- 68 (7) Indeterminate

Appendix B-3

Observation Schedule Definitions

Teacher

Direction — This dimension of teacher behavior is used to describe whether the teacher is the originator or recipient of an interaction.

1. Initiates. Teacher starts an interaction with object. Both teacher and object begin to attend to one another because of teacher's behavior.

2. Responds. Teacher continues an ongoing interaction with object by actively acknowledging a communication.

3. Listens or watches. 30 seconds of nonverbal, passive acknowledgment of communication; e.g., teacher listens to child reading aloud.

4. Noncommunicative. 30 seconds without interaction; e.g., teacher works at desk, glances at but does not interact with any object.

Object — This dimension is used to indicate the nature of the other party involved in the interaction with the teacher.

5. Single child. Teacher's interaction is with only one child.

6. Small group. Teacher's interaction is with two or more children together but less than the whole class; e.g., teacher gives instructions to small reading group.

7. Whole group. Teacher's interaction is with entire class; e.g., teacher explains homework assignment to class.

8. Himself. Teacher is noncommunicative; no interaction takes place; e.g., teacher corrects papers at desk.

Publicity — This category is used to indicate whether there is an audience to the behavior.

9. Publicly. Teacher's communication is heard and observed by more than the object; e.g., another child is listening and watching while the teacher helps object with assignment.

10. Privately. Interaction is only heard and seen by object.

11. Indeterminate. Teacher's behavior is not clear or is not defined by listed categories.

Behavior This category is used to define the nature of the particular overt action of the teacher.

12. Provides information. Teacher makes neutral statement of fact; e.g., teacher explains assignment, teacher reads a story to the class.

13. Simple approving statement. Brief supportive comment or nonverbal gesture; e.g., "That's right," or teacher nods head in agreement.

14. Develops student idea. Teacher extends child-originated idea noncritically; e.g., "Yes, a dog is an animal, and furthermore it has a tail."

15. Recognizes abilities, interests. Verbal behavior showing awareness of object's special skills or interests; e.g., "You liked this story so much yesterday . . .," or teacher provides more time for artwork for a child with special skill.

16. Recognizes improvement. Verbal behavior showing awareness of growth in ability to handle a situation or task.

17. Recognizes effort; encouragement. Supportive gestures or or statements showing awareness of work done on a task. Comments or gestures which provide support toward continuing work.

18. Recognizes feeling. Verbal or nonverbal communication expressing understanding of object's emotional state.

19. Recognizes individual initiative. Expression of acceptance and approval of original or unusual child-originated idea; e.g., "Very good, you went ahead and did the next page without asking me."

20. Asks question or elicits response. Teacher poses simple question, e.g., "What is 5 + 3?"

21. Offers choices. Teacher allows children to choose between alternatives; e.g., "Would you rather work on arithmetic or reading until recess?"

22. Asks student to develop idea. Teacher asks or encourages child to elaborate on child-originated idea; e.g., "Can you explain that further?

23. Suggests equality. Verbal statement by which teacher removes himself from position of authority; e.g., "I don't know the answer. How could we find out?"

24. Gives directions. Teacher gives explicit instruction to object; e.g., "Line up for recess."

25. Controls--moderate. Attempts to regulate an on-going child behavior with neutral or mild affect; e.g., "Stop talking and get to work."

26. Controls--harsh. Attempts to regulate an on-going behavior with harsh and/or punitive affect; e.g., teacher uses loud angry voice or tone of harsh ridicule.

27. Short criticism. Brief and simple negative comment without explanation or provision of alternatives; e.g., "No, that's wrong."

28. Criticism with explanation. Negative statement accompanied by rationale or alternative; e.g., "No, that's wrong. If you do it that way, the numbers won't add up."

29. Harsh criticism. Negative statement with strong negative affect--without rationale or provision of alternatives; e.g., teacher uses loud angry voice.

30. Evaluating. Teacher checks or judges progress of children's work; e.g., teacher walks around classroom noting children's progress on class list.

31. Transition behavior. Thirty seconds of behavior during passing from one stage to another of classroom activity; e.g., teacher places finished papers on desk and picks up new papers to be handed out.

32. Indeterminate. Same as category #11.

Content This dimension is used to indicate the nature of the topic involved in the behavior.

33. Subject matter. Teacher's behavior deals with assigned or appropriate aspects of curriculum.

34. Performance goals. Teacher's behavior involves child's objectives for type and duration of subject matter tasks; e.g., "Do you think you can finish this by tomorrow?"

35. Routine procedures. Teacher's behavior deals with daily routines and simple classroom directions; e.g., "It's time for recess"; or "Open your books to page 5."

36. Behavior. Teacher's behavior deals with quality of behavior of object; e.g., "Please be quiet; you're talking too much today."

37. Personal qualities. Teacher's behavior deals with personality and physical attributes of object; e.g., "You're a very generous person."

38. Human Relations. Teacher's behavior deals with interpersonal activities and feelings; e.g., "How do you feel about fighting inside or outside the classroom?"

39. Indeterminate. Same as category #11.

40. Singular attention. Teacher attends only to object of interaction.

41. Divided attention. Teacher's attention leaves and returns to object; e.g., while listening to one child read, teacher looks up at another then returns gaze to reader.

Child

Direction This dimension of child behavior is used to describe whether or not the child is an originator or recipient of an interaction.

42. Initiates. Child starts an interaction with object. Both child and object begin to attend to one another because of child's behavior.

43. Responds, listens, watches. Child continues an ongoing interaction, acknowledges communication through verbal and nonverbal participation in established interaction.

44. Noncommunicative. Child does not interact with anyone else for at least 30 seconds; may include listening and watching without awareness or participation by object of attention.

Object This dimension is used to indicate the nature of the other party involved in the interaction with the child.

45. Single child. Child's interaction is with only one child.

46. Group. Child's interaction is with two or more other children.

47. Teacher. Child's interaction is with the teacher.

48. Teacher and task. Child listens to teacher while looking at or working on task; child's attention is almost evenly divided between teacher and task; e.g., child writes down words on paper as teacher reads them aloud.

49. Himself and task. Child is noncommunicative and attends only to himself and/or his task; e.g., daydreaming, desk-work.

Content This dimension is used to describe whether or not the child is attending to a teacher appropriate task.

50. Work. Teacher prescribed or teacher appropriate task; e.g., child reads aloud from textbook; child works quietly at art project.

51. Nonwork. Activity not authorized by teacher; e.g., digging holes in desk top.

52. Vacant. No apparent involvement in any activity; e.g., daydreaming.

53. Indeterminate. Same as category #11.

Affect This dimension is used to describe the child's emotional tone during the observation.

54. Enthusiastic. Involvement in activity with strong positive affect, not distractible; e.g., smiling face, animated voice.

55. Positive, normal interest. Involvement in activity with positive affect, not easily distractible.

56. Neutral. Passive acceptance of activity; child may be distracted.

57. Embarrassed uncomfortable, shy. Child appears self-conscious; e.g., blushes, giggles, uncomfortable.

58. Negative, displeased. Child expresses some unhappiness; e.g., frowns, appears sulky.

59. Hostile. Child expresses anger, strong displeasure; e.g., child fights with another child; uses loud angry tone with teacher, refuses to work.

60. Indeterminate. Same as category #11.

Motivation This broad dimension relates to what incentives or needs appear to be involved in the child's activity.

61. Affiliation, social. Primary reason for behavior appears to be pleasurable interaction with others; e.g., smiling face while interacting with another child.

62. Curiosity, learning, achievement. Behavior motivated primarily by the sense of competence, mastery and achievement to be derived from a given task or classroom activity.

63. Following directions. Primary reason for behavior appears to be routine and automatic execution of instructions; e.g., child clears desk after teacher gives instructions; child reads sentence as instructed without involvement.

64. Compliance. Primary reason for behavior appears to be execution of instructions contrary to child's own wishes, e.g., child frowns while putting away activity, and sullenly begins new task.

65. Disruptive. Primary reason for behavior appears to be to cause disorder or termination of ongoing classroom activity; e.g., child runs around room encouraging other children not to do work.

66. Unhappiness. Primary reason for behavior appears to be unpleasant personal feelings.

67. Escaping boredom. Primary reason for behavior appears to be seeking an alternative to an unsatisfying activity; e.g., daydreaming, nonwork.

68. Indeterminate. Same as category #11.

Appendix B-4

Teacher Forced Rating Forms

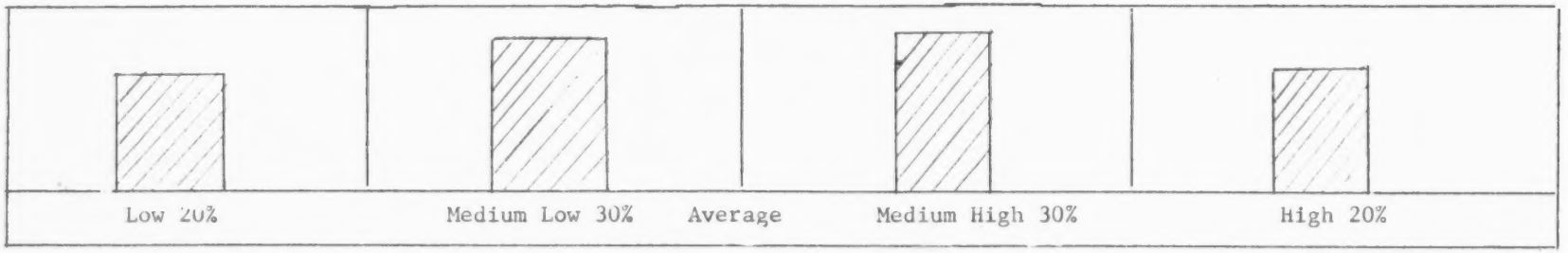
Date_____

Teacher_____ Student Physical Development

Children high on this dimension are physically well developed, healthy, have good coordination, are graceful, do not get fatigued readily, enjoy sports. (You may want to compare boys first, then girls, but please put them on the same sheet, in the four sections provided.) They may not be high on the other three dimensions.

Weight 1 2 3 4

\CHILDREN OF YOUR CLASS/



77

\ALL CHILDREN OF THIS AGE/

Think of your lowest child and your highest child on physical development; these will be the ends of your class scale. Write their names on your scale, then place the rest of the children also in the four groups which are roughly the size of the "all children" scale. For a class of 33, this would be approximately 6 or 7 children in the High Group, 9, 10, or 11 in the Medium High and Medium Low, 6 or 7 in the Low Group. However, you may have slightly different numbers in these groups.

Date_____

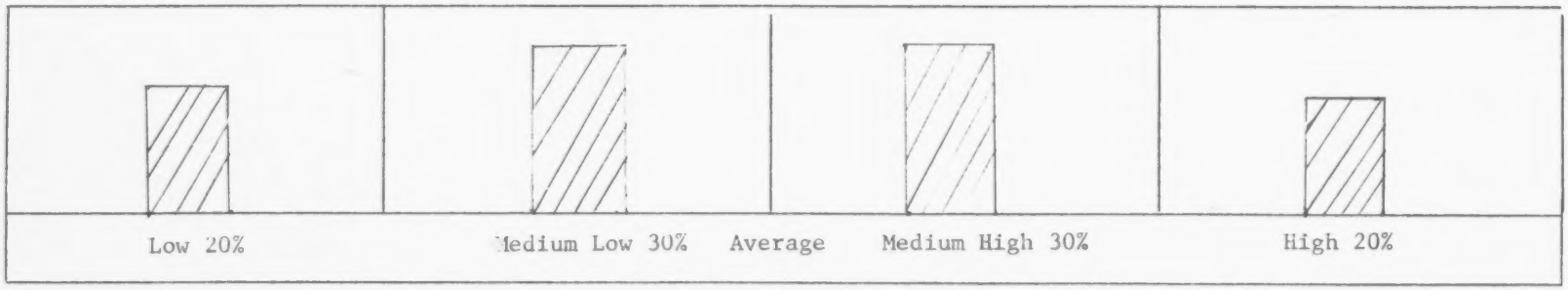
Teacher_____ _____

Social Development

Children high on this dimension get along well with teacher and other children. They can stand up for their own rights without getting into squabbles. They do not dominate other children, although they may be leaders, and they are not dominated by others. They have at least one good friend. Their relationship with the teacher is friendly.

Weight 1 2 3 4

CHILDREN OF YOUR CLASS



ALL CHILDREN OF THIS AGE

Think of your lowest child and your highest child on social development; these will be the ends of your class scale. Write their names on your scale, then place the rest of the children also in the four groups which are roughly the size of the "all children" scale. For a class of 33, this would be approximately 6 or 7 children in the High Group, 9, 10, 11, in the Medium High and Medium Low, 6 or 7 in the Low Group. However, you may have slightly different numbers in these groups.

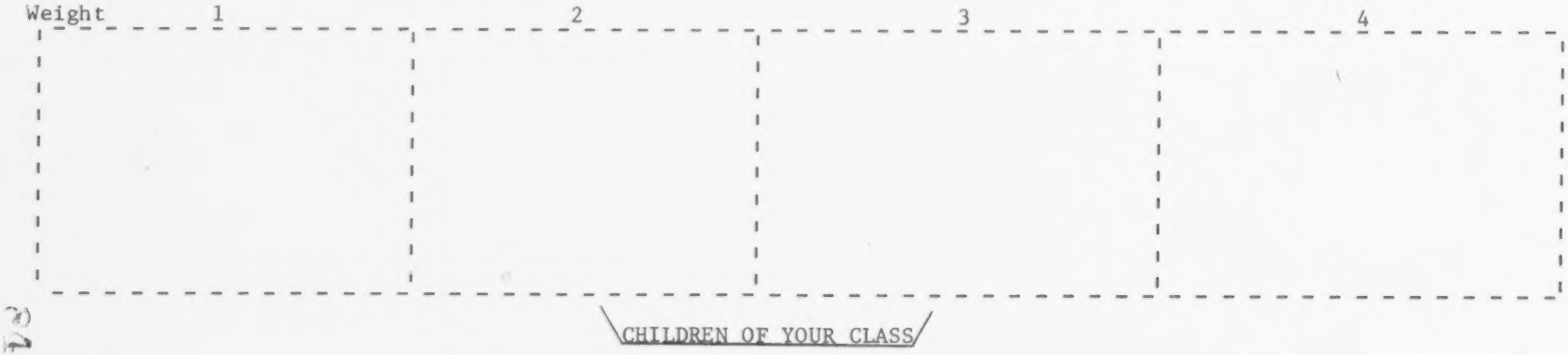
Date_____

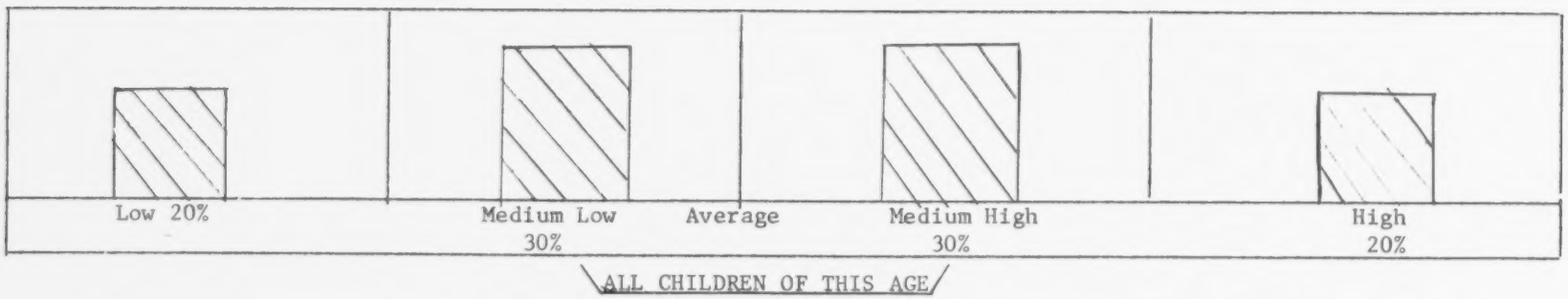
Teacher_____

Emotional Development

Children high on this dimension can deal with most situations with only minor disappointments, do something about their problems as they arise, do not show undue sensitivity or anxiety in connection with school experiences, have a good sense of humor and seem to feel some self-confidence in their own abilities to handle any usual situation. They can tolerate some frustration.

Again, children high on this may be low on the other three dimensions.



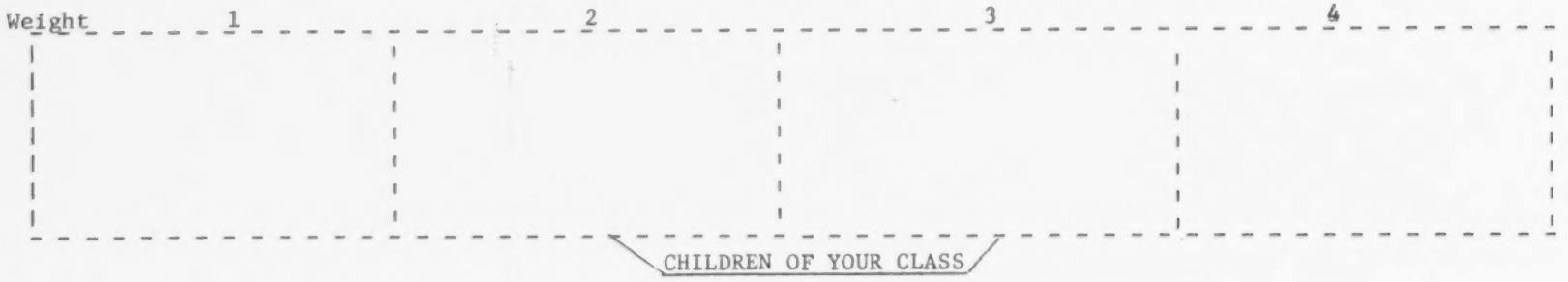


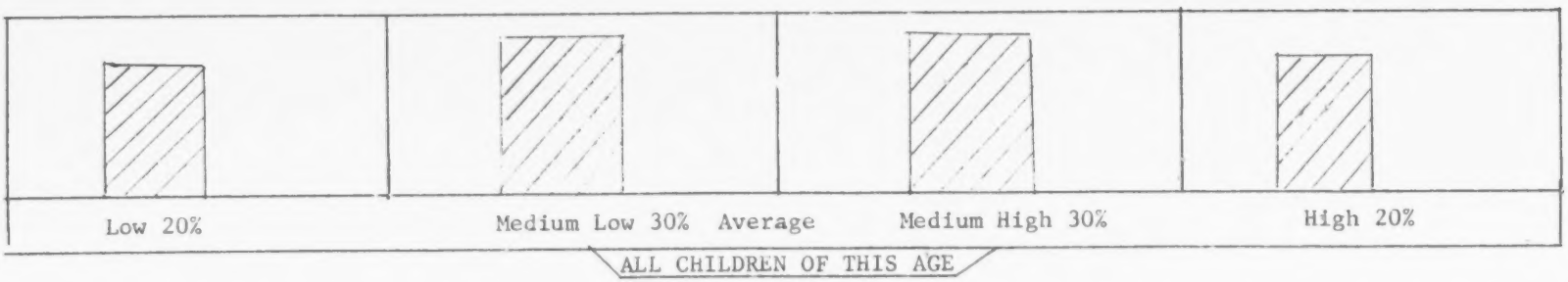
Think of your lowest child and your highest child on emotional development; these will be the ends of your class scale. Write their names on your scale, then place the rest of the children also in the four groups which are roughly the size of the "all children" scale. For a class of 33, this would be approximately 6 or 7 children in the High Group, 9, 10, or 11 in the Medium High and Medium Low, 6 or 7 in the Low Group. However, you may have slightly different numbers in these groups.

Date_____

Teacher_____ Intellectual Development

Children high on this dimension have good language development, do well (at their own level) in most schoolwork, have good ideas, can remember, learn, and apply information to new problems. Some may be creative, in the sense of having out-of-the-ordinary and perhaps original ideas. They can reason well for their age.





Think of your lowest child and your highest child on intellectual development; these will be the ends of your class scale. Write their names on your scale, then place the rest of the children also in the four groups which are roughly the size of the "all children" scale. For a class of 33, this would be approximately 6 or 7 children in the High Group, 9, 10, 11 in the Medium High and Medium Low, 6 or 7 in the Low Group. However, you may have slightly different numbers in these groups.

Appendix B-5

Inter-Observer Reliability: Teacher

Three graduate students were trained as observers in six third-grade classrooms to establish inter-observer agreement prior to data collection. Observer #3 was trained to use only the child behavior side of the observation schedule (items 42-68). After reliability was reached with each of the other observers, she collected data only on the behaviors of the sample children. Simultaneous observations were made by a pair of observers. Following these observations, sources of disagreement and ambiguity were discussed and clarified. This procedure was repeated until satisfactory agreements were obtained over at least eight rounds of observation in each classroom. The final percentage of inter-observer agreement reached before data gathering is shown below.

Percentage of Inter-Observer Agreement Obtained on the Observation Schedule: Teacher Dimension

	Observer #1 and Observer #2
	All 6 Classrooms 64 Rounds
Dimensions	
Direction	85%
Object	97
Publicity	97
Behavior	89
Content	84
Attention	89

Appendix B-6

Percentage of Inter-Observer Agreement Obtained on the Observation Schedule: Child Dimensions

	Observer #1 and Observer #2	Observer #2 and Observer#3	Observer #1 and Observer #3
	All 6 Classrooms 64 Rounds	All 6 Classrooms 101 Rounds	4 Classrooms 59 Rounds
Dimensions			
Direction	100%	84%	85%
Object	97	86	86
Content	92	88	93
Affect	73	76	86
Motivation	82	86	90

Appendix B-7

Consistency of Child Behavior Observation Categories
(First Five Rounds Vs. Last Five Rounds,
Corrected for Length by Spearman-Brown)

Direction	
Initiates	-.18
Responds	.41
Noncommunicative	.47
Object	
Single Child or Group	.35
Teacher, Teacher/Task, or Himself/Task	.35
Content	
Work	.47
Non-work, Vacant, or Indeterminate	.42
Affect	
Enthusiastic, Positive Normal Interest, or Neutral	.47
Embarrassed, Negative, Hostile	.47
Motivation	
Affiliation, Social	.64
Curiosity, Learning, Achievement, or Following Directions	.56
Compliance, Disruptive, Unhappiness	.21
Escaping Boredom	.40